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ABSTRACT

This report summarizes the presentations and discussions at an international seminar designed to provide an opportunity for the exchange of ideas about maximizing the use of information technology as a strategic weapon for achieving organizational changes and goals, and for achieving a competitive advantage. Among these presentations were the papers and case studies commissioned under the United Nations Centre for Regional Development (UNCRD) Research Project on the Evaluation of Information Systems Projects and Training Programmes in Computer-Assisted Regional Planning. A number of issues and problems relevant to information management were identified at the seminar, including user participation in information systems design; the human dimension of information technology; training of staff at all organizational levels; and organizational issues. The major problems discussed included how information technology can best be used to establish competitive advantage and improve the quality of life; how such technology can be established through a hierarchy of communications networks and how the social infrastructure can be provided; how to provide the technical and organizational expertise needed to operate the software and to organize its use in a variety of contexts; how to generate cost effective solutions in the introduction of information technology; and how to closely monitor the changes in the transition to an information society. The text is supplemented by various diagrams and tables, and four appendices contain lists of papers presented, participants, and the drafting committee members, and an aide-memoir for the seminar. (Author/EW)

Information Systems for Government and Business

Challenges and Opportunities

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Report and Summary of Proceedings of
the Second Kawasaki International Seminar on
the Information Systems Challenge for Government and Business
21-24 July 1987, Kawasaki City, Japan

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SECOND KAWASAKI INTERNATIONAL SEMINAR ON THE INFORMATION SYSTEMS CHALLENGE FOR GOVERNMENT AND BUSINESS ▼

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INFORMATION SYSTEMS FOR GOVERNMENT AND BUSINESS

Challenges and Opportunities

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United Nations
Centre for Regional Development

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FOREWORD

On 21-24 July 1987 the United Nations Centre for Regional Development (UNCRD) and the Kawasaki City Government organized the Second Kawasaki International Seminar on the Information Systems Challenge for Government and Business, in Kawasaki City, Japan. The seminar was well attended and stimulated a lively discussion. Many participants contributed papers and were active in the discussions.

The seminar gave the participants the chance to exchange ideas about maximizing the use of information technology (IT), in view of the fact that IT is a strategic weapon for achieving organization changes and goals, and also for achieving a competitive advantage. It also gave a chance to examine the role of the public and private sectors in the development and implementation of information systems. The seminar also discussed the innovative advanced information city approach being undertaken by Kawasaki City.

The whole emphasis of the seminar was on practice and case studies. From the comparative international case studies of information systems projects and training and research programmes in information systems, there are certain important features of successful information systems initiatives. These are: Top-level commitment and support, a clear and consistent strategy, management awareness, training of staff at all levels, clearly defined responsibility for information systems development and implementation, and user involvement.

The seminar identified a number of issues relevant to information management: User participation in information systems design; the human dimension of IT; training; and organizational issues.

The output from the presentations and discussions is summarized in this seminar report. The publication is in two parts. The first part deals with the report of the seminar. The second part covers the summary of proceedings. Lists of participants and papers presented at the seminar are included in the appendices.

The Kawasaki City Government under the leadership of Mayor Saburo Ito has greatly honoured us by its tremendous support for the seminar. We wish to acknowledge a special debt of gratitude to the city government officials, council members, and staff for their continued cooperation in co-sponsoring the series of Kawasaki seminars on information systems.

To all the invited experts we are grateful for the inspiring way they presented their papers and comments, asked questions, and cooperated in the seminar. We also acknowledge the assistance of the rapporteurs, who undertook the writing of the session reports.

Most of all we are grateful to the members of the Drafting Committee for the thought and efforts they put into writing, discussing, revising, and rewriting the Second Kawasaki Declaration and Plan of Action. We trust that they accept our sincere thanks through the names of the UNCRD and the Kawasaki City Government.

The UNCRD and the Kawasaki City staff performed important seminar tasks, including the management, production, and distribution of seminar papers and reports. We are grateful for their contribution. Particular thanks are due to: J. S. Edralin, UNCRD Information Systems Planner and Information Systems Research Project Coordinator for compiling and editing this seminar report; Hideaki Hoshina, UNCRD Physical Planner for his assistance in managing the seminar; James F. Goater, UNCRD Documentation Assistant for his help in publishing this report; and Sachiko Sasaki, UNCRD Publications Assistant for ensuring this report is typed on schedule.

H. Sazanami

22 September 1987

Hidehiko Sazanami
Director, UNCRD

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PART I: REPORT OF THE SECOND KAWASAKI INTERNATIONAL SEMINAR

INTRODUCTION

Objectives

The Second Kawasaki International Seminar on the Information Systems Challenge for Government and Business was held in Kawasaki City, Japan on 21-24 July 1987. The major goals of the seminar were to discuss and assess the problems, prospects, and challenges in developing and implementing information systems, and to make recommendations for further action research, training, and networking initiatives in information systems for planning and decision making in government and business.

The specific objectives of the seminar were:

(a) to review and assess current experiences and trends in the development and implementation of information systems and technologies for planning;

(b) to identify the lessons learned that will be of relevance to other organizations in the process of developing their information systems, evaluating their existing systems, assessing their future requirements, and proposing the development of an information systems strategy;

(c) to discuss possible approaches to promote public-private sector partnerships in information systems; and

(d) to prepare a declaration and a plan of action of the seminar.

Theme

The seminar theme was "Challenges Facing Managers and Officials in Developing and Developed Countries." Five sessions related to this theme were organized: The challenge of information systems today; information systems opportunities; comparative international case studies and evaluations of information systems projects and training and research programmes in information systems for planning; developing and implementing effective information systems strategies; and approaches to an advanced information city.

In addition, two panel discussions were organized on: Public-private sector partnerships in information systems, and the advanced information city.

Discussion at the seminar was organized around questions dealing with the development of information systems, impacts of information systems, use of information systems, and current and future opportunities in information systems.

Brief Conclusions

The conclusions can be summarized as follows:

(1) In the late 20th century, there would appear to be more than enough technology to establish the advanced information city and society, and the emphasis is changing from the development of new forms of hardware to the further elaboration of software and methods involving its use and organization in both government and business. There remain major problems in exploring how such technologies can best be used to establish competitive niches and to improve the quality of life.

(2) Substantial progress in the development of such systems has been made in the last decade towards establishing such systems as the basis of both the information city and the method of understanding and planning such cities. There is a convergence between the development of such systems for a whole range of economic and social uses in work and at home, and their use for more strategic planning and management. In particular, the pioneering efforts of Kawasaki City Government in establishing new technological infrastructure as a means of moving from an established, declining industrial structure to one in which the competitive edge is based on information activities, was considered at the seminar. However, further research is required into how such technologies can be physically established through a hierarchy of communications networks, how such networks will ultimately be used, and how the social infrastructure can be provided.

(3) New information systems involving the creative exploitation of a variety of media and styles, from the most routine to strategic applications, are now possible. As the information economy and the way we use it continues to expand, new forms of information occupations emerge which require training. New forms of expertise spanning the technical and organizational are required, not only to put the hardware in place and to operate the software but to organize its use in a variety of contexts. New forms of training are thus required.

In government as well as business, the users of such information systems should be involved in their development, if systems analysts and end-users are to effectively communicate. Moreover, efforts must be made to generate cost-effective solutions in the introduction of information technology.

(4) Many reviews and assessments on the role and impact of information systems in urban societies have been made but there is still an urgent need for close monitoring of changes in the transition to an information society. Failures in developing and adopting new technologies must be charted as well as successes, emphasizing appropriate and inappropriate ways of implementation. Questions of standardization of the technology itself, communications networks, software systems, and ways of use are all high on the agenda of current and future study and research. Partnership and cooperation between government and business is an urgent prerequisite for the successful exploitation of both current and future opportunities. Devising ways of establishing new competitive niches but avoiding at the same time negative externalities on other segments of urban society is a major challenge for the coming decades.

Brief Recommendations

The following general actions were recommended:

(a) The application of information systems in multilevel planning contexts in both developed and developing countries;

(b) The forging of public-private partnerships in the planning, implementation, and provision of information systems; and

(c) The establishment of linkages between developed and developing countries and public and private sectors, in order to understand differences and similarities in design and implementation of information systems and to promote mutually-beneficial exchanges of experiences and approaches.

The seminar was a follow-up to the recommendations of the First Kawasaki International Seminar on Information Systems for Urban and Regional Planning held in Kawasaki City on 3-6 October 1984 and the UNCRD Expert Group Meeting on Training in Information Systems for Local and Regional Planning held in Nagoya on 16-19 June 1986. The seminar also constituted part of phase III of the UNCRD Research Project on Information Systems for Local and Regional Development. Phase III of the research project focused on the Evaluation of Information Systems Projects and Training Programmes in Computer-Assisted Regional Planning.

Participants and Sponsors

The seminar was well attended, with two hundred and seventy-two participants from developing and developed countries (Australia, Canada, France, Indonesia, Italy, Japan, Malaysia, Netherlands, People's Republic of China, Saudi Arabia, Singapore, Socialist Republic of Yugoslavia, Thailand, United Kingdom, and United States of America), two representatives from international information systems associations, and four representatives from United Nations organizations. The seminar was jointly organized and sponsored by the United Nations Centre for Regional Development (UNCRD), the United Nations Department of Technical Co-operation for Development, and the Kawasaki City Government. Cooperating organizations included: World Health Organization (WHO); Data for Development International Association; Spatially-Oriented Referencing Systems Association (SORSA); National Land Agency, Ministry of Foreign Affairs, Ministry of International Trade and Industry, Ministry of Posts and Telecommunications, and Ministry of Construction of the Government of Japan; Kanagawa Prefectural Government; City Planning Institute of Japan; Japan Association for Planning Administration; Urban Intelligence Institute of Japan; and Japanese Association of Surveyors.

SECOND KAWASAKI DECLARATION ON THE INFORMATION SYSTEMS CHALLENGE FOR GOVERNMENT AND BUSINESS

There is a need in both developed and developing countries to urgently address social and economic issues stemming, especially in the developing countries, from demographic change, urbanization, and deteriorating environmental conditions.

At the same time, continuing advances in information technology which encompasses computers, telecommunications, and office technologies, present new opportunities in the emerging information society to improve planning, policy formulation, and decision making in government and business.

Information systems have been more successfully implemented and have proven more appropriate to the aforementioned needs when government, business, academic and research institutions, concerned individuals, and international organizations have combined their efforts through innovative partnerships.

The participants of the Second Kawasaki International Seminar on the Information Systems Challenge for Government and Business urge that high priority be given to:

(1) using information technology to promote personalized technology for the improvement of society at all levels.

(2) promoting the awareness of the value and future role of information and information technology among policymakers, the general public, and other potential users.

(3) developing human resources through effective education and training, including those resources required to develop and use information technology widely and creatively.

(4) encouraging the sharing of information and experience about the application of information technology.

(5) conducting research and studies on the implementation and evaluation of information technology appropriate to developing countries.

(6) expanding and strengthening existing collaborative networks of experts, users, and facilitators.

(7) using advances in information systems and technology to renew and humanize planning and decision making, including planning methods and planning priorities, towards the promotion of a better quality of life.

In order for information technology to play a vital role in support of planning, decision making, and management at the local, regional, and national levels of government, in urban and rural areas, and in the business sector of developing and developed countries while affecting societies as a whole in positive fashions, the participants:

(1) call for conscious attention to the use of information systems and technology to promote development in all sectors and regions and to reduce disparities and inequalities.

(2) call for continued development and application of information systems and services at all levels of government and business, placing particular emphasis on the application of information systems in the multilevel planning context in both developed and developing countries, the forging of public-private partnerships in the planning, implementation, and provision of information services, and the establishment of links between developed and developing countries and public and private sectors.

(3) urge national governments to establish national focal organizations to:

   (a) formulate and implement a national policy for the development of information systems and services; and

   (b) promote and coordinate national participation in international activities in this field.

(4) recommend:

   (a) the development of indigenous training capabilities in all countries, with the aim of promoting increased self-reliance in the production and use of information and information technology;

   (b) the development of effective national and international programmes for the training of trainers, to ensure interactive and adaptive training capacities;

   (c) the establishment of pilot projects in developing and developed countries to test innovative concepts in information systems and services design and use, such as the Kawasaki Campus City plan;

   (d) the establishment of assistance and advisory services for aid, in developing countries, to national, regional, and local agencies, and for the development of the capacity of local private sector enterprises to support public organizations effectively;

   (e) the preparation of state of the art assessments concerning appropriate information technology and strategies (including software, data, training, information systems management and implementation, standardization activities, methods for assessing the benefits and costs of information systems strategies, and other elements);

   (f) the development of dissemination mechanisms such as international networks, international congresses, such as the Kawasaki International Seminars, and specialized meetings of experts and of managers and public officials; and

(g) the development of information systems approaches to promote more effective participation.

(5) recommend the establishment of an organized programme of cooperation among countries and institutions, with a single organizational focal point to facilitate information dissemination and coordination.

(6) recommend that the UNCRD should provide the needed organizational focal point to take a lead role in this programme, in cooperation with other international, national, regional, and local and specialized organizations by:

(a) establishing formal linkages with appropriate national and international organizations, including national focal organizations, which will benefit from and support the programme;

(b) establishing a major programme of information dissemination, including international networking activities;

(c) providing advisory services, as needed, in coordination with other organizations; and

(d) playing a lead role in organizing international congresses such as the Kawasaki Seminars, on a biennial basis.

(Approved by the participants of the Second Kawasaki International Seminar on the Information Systems Challenge for Government and Business, 24 July 1987, Kawasaki City, Japan)

SECOND KAWASAKI INTERNATIONAL SEMINAR ON THE INFORMATION SYSTEMS CHALLENGE FOR GOVERNMENT AND BUSINESS

21-24 July 1987

Kawasaki City, Japan

PLAN OF ACTION

1. CONCLUSIONS

1.1 Preamble

The development of information systems which form the basis of the advanced information society is proceeding with unprecedented speed. The continued miniaturization of computer systems and the emergent synthesis of computers and telecommunications which form the new building blocks of technological infrastructure pose enormous challenges and opportunities for advanced industrial societies in the developed world as well as in the developing world. Technological challenges continue to be elaborated with respect to new forms of hardware and the proliferation of software across the whole spectrum of government, business, and domestic uses, but increasingly, the challenges and opportunities lie in designing new forms of organization which enable such technologies to be exploited to the full. Social and political questions involving the use and access to these technologies remain to the fore and it is clear that in the next decade, our concern will be focused on how such technologies can be used to enhance the quality of life for all, how such technologies can be implemented and organized to limit adverse effects on various social groups and economic sectors, and how government and business can combine to enable such technologies to be appropriately applied.

It is already clear that the continued and future implementation of information systems must involve unique collaboration of government, business, academic and research institutions, concerned individuals, and international organizations in ways which have hitherto been largely absent. Information systems in terms of their technology and use are all-pervasive, affecting every sphere of social and economic life, and their successful implementation demands the combined skills of the public and private sectors working in partnership. New forms of partnership will be required which imply new forms of social organization, and such partnerships will involve a variety of organizations and institutions with both profit and nonprofit-making rationales. These challenges and the opportunities they imply span both developed and developing countries, bridging the gap between established and emergent industrial economies and focusing attention on the related issues of the international economy and global division of labour.

The emerging information society presents two major challenges and opportunities to developing countries. Firstly, as the developed world marches into the information age, the developing countries should not be left behind to become the "information have-nots." Secondly, advances in information technology can, in fact, be exploited to accelerate the social and economic development of developing countries. There is an urgent need to research into and formulate strategies and action programmes to bridge the information and information technology gap between the developing and developed countries, and to identify and apply appropriate information technology to further the development objectives of developing countries. In particular, action is needed to build up indigenous capability to multiply the skills and knowledge and capacity to apply appropriate new technology in developing countries.

The Second Kawasaki International Seminar with its emphasis on the need to establish a comprehensive understanding of the development, impact, and use of information systems highlighted the need to understand and plan for the emergent information society by bridging both the public and private domains of social and economic activity in government and business, and in contrasting experiences and transferring technology between both the developed and developing world. In the sequel, we will first elaborate these conclusions drawn from the Seminar and then develop related recommendations.

1.2 The Development of Information Systems

In the late 20th century, there would appear to be more than enough technology to establish the advanced information city and society, and the emphasis is changing from the development of new forms of hardware to the further elaboration of software and methods involving its use and organization in both government and business. There remain major problems in exploring how such technologies can best be used to establish competitive niches and to improve the quality of life. What is also emerging is considerable unevenness in the adoption and use of information technology, not only between the developed and developing world but within such worlds, between different social groups, economic sectors, and institutions. This unevenness is also reflected in the comparatively slow progress in developing the "electronic cottage" and "electronic office," in connecting up the massive technological infrastructure which already exists and is in place, but perhaps more importantly, in engendering new forms of communication which imply a break with past and established patterns and habits of human behaviour.

Information systems are also central to the international economic system. The world economy is increasingly an "on-line" economy in which decisions are being effected by access to information through the new technology and by the implementation of new technology in a whole range of economic sectors. Both the traditional manufacturing sectors and new service economies are being revolutionized by the development of information systems and the development of novel, innovative, and hitherto unanticipated uses of such technology in government and business. These developments constitute major challenges in understanding as well as opportunities for new patterns of work and communication.

1.3 Impacts of Information Systems

Substantial progress in the development of such systems has been made in the last decade towards establishing such systems as the basis of both the information city and the method of understanding and planning such cities. Indeed there is a convergence between the development of such systems for a whole range of economic and social uses in work and at home, and their use for more strategic planning and management. This focus suggests that the impacts of such systems are best understood and planned for in terms of a spectrum of uses from the most routine to the most strategic, thus reflecting the use of systems in real-time, as well as their frequency of use.

The impact of information systems in terms of a new technology of cities was considered at the Seminar. The pioneering efforts of Kawasaki City Government in establishing new technological infrastructure as a means of moving from an established, declining industrial structure to one in which the competitive edge is based on information activities, was considered, among other Japanese initiatives. Further research is required into how such technologies can be physically implemented through a hierarchy of communications networks, and Kawasaki City is in the vanguard of demonstrating how such networks can be used to generate economic growth and cultural interaction. But of equal significance, is the social infrastructure which such technological infrastructure implies. Who has access to such infrastructure, who gains and who loses through it, who provides the training in its use, who ultimately provides the infrastructure, and how the public-at-large might be involved in its design, are all urgent questions raised by this Seminar. If a situation of information have and have-nots, information-rich and -poor segments of society is to be avoided, the social and organizational impacts of such new technologies will have to be studied and countered by policies designed by unique partnerships of government and business. If these tasks are seen only as the prerogative of government which is the traditional way, negative impacts and externalities will not be avoided. Only through partnership can the future information city be appropriately planned just as only through partnership can appropriate systems and uses be devised. International agencies such as the United Nations Centre for Regional Development (UNCRD) have a unique role to play in focusing such efforts, initiating research, and in guiding progress towards the efficient and equitable development of information systems.

1.4 The Use of Information Systems

New information systems involving the creative exploitation of a variety of media and styles, from the most routine to strategic applications, are now possible. Information systems dealing with routine control of urban infrastructure through to geographical information systems dealing with strategic planning and management are increasingly based on new methods of presentation and communication involving graphical and semi-intelligent interfaces. Networks of communication from the most local to global also enable new and innovative uses of information systems and these systems are leading to a proliferation of new roles and tasks, involving different types of end-user, professional, and analyst.

As the information economy and the way we use it continues to expand, new forms of information occupations emerge which require training. Raising awareness in end-users is no longer as simple a matter to articulate and plan for as it was considered a decade or so ago. New forms of expertise spanning the technical and organizational are required, not only to put the hardware in place and to operate the software but to organize its use in a variety of contexts. New forms of training are thus required and part of the new infrastructure of the information city should be new forms of such training, both institutionally and as part of the network of information for planning the city itself.

Increasingly, individuals will also operate in several different roles -- as end-users, as analysts, as information brokers, as organizers of information technology, and so on. Accordingly, training should be as equally all-pervasive as the information technology itself, established both formally in educational and training centres, in the form of networks using the very infrastructure in which training is required, and increasingly as part of the software. Fifth-generation computing systems and styles involving knowledge-based information and institutional systems, artificial intelligence, and expert systems are likely to make a major impact on such training.

In government as well as business, the users of such information systems should be involved in their development if systems analysts and end-users are to effectively communicate. Moreover, efforts must be made to generate cost-effective solutions in the introduction of information technology, recognizing the need to demonstrate tangible short-term benefits as well as their longer-term advantages. In this quest, UNCRD has a major role to play in building on its current commitment in effectively enabling information systems to be introduced to developing countries. This inevitably involves a comparison between the use of such systems in developed and developing countries in the recognition that both contexts contain experiences which are relevant and transferrable.

1.5 Progress to Date: Current and Future Opportunities

Considerable insights have already been gained into the role and impact of information systems in urban societies. Many reviews and assessments have been made but there is still an urgent need for close monitoring of changes in the transition to an information society. Failures in developing and adopting new technologies must be charted as well as successes, emphasizing appropriate and inappropriate ways of implementation. Questions of standardization of the technology itself, communications networks, software systems, and ways of use are all high on the agenda of current and future study and research. New case studies of the information city and of the use of information systems in all sectors of government and business are required with an emphasis on nontechnical impacts involving the psychology of use, and the social and economic impact of such systems, all set within the political nexus of information technology use and adoption.

Partnership and cooperation between government and business, spanning the spectrum of public-private agencies, is an urgent prerequisite for the successful exploitation of both current and future opportunities. Devising ways of establishing new competitive niches but avoiding at the same time dramatic and unanticipated negative externalities on other segments and sectors of urban society is the major challenge of the next decades. In this, public and private, government and business, developed and developing countries partnerships and collaborations will be essential.

1.6 The Kawasaki Seminar and the Role of UNCRD

The forum already established between Kawasaki City Government and UNCRD is an example of the sort of partnership required at all levels if the information city and society is to be successfully established. In this, the partnership on which the First and Second Kawasaki Seminars have been based, has successfully broached a range of issues relevant to a better understanding and planning of information systems. In this, the first declaration from the 1984 seminar, as well as that of the Nagoya expert group meeting in 1986 represent essential building blocks in the plan of action and declaration to be made here. But partnerships must be wider than this. Other agencies are concerned with similar issues and it is essential that some form of global cooperation be established. The Visakhapatnam Declaration promoted by UNESCO in 1985 is embraced by our concerns here, and future links to other agencies such as OECD, World Bank, as well as to national government and research agencies concerned with similar problems, must be forged.

Developing such partnerships and collaboration through centres, networks, training programmes, and research initiatives is the essence of our recommendations to be developed below. These will focus upon ways in which the future development, use, and impact of information systems in government and business in both developed and developing countries, can be appropriately researched, understood, implemented, and assessed.

2. RECOMMENDATIONS

2.1 General Recommendations

There is a major need for continued development and application of information systems and services at all levels of government and business, placing particular emphasis on:

(a) the application of information systems in multilevel (i.e., local/regional/national) planning contexts in both developed and developing countries;

(b) the forging of public-private partnerships in the planning, implementation, and provision of information services; and

(c) the establishment of linkages between developed and developing countries and public and private sectors, in order to understand differences and similarities in design and implementation of information systems and to promote mutually-beneficial exchanges of experiences and approaches.

The following specific elements should be developed:

(1) National focal points and programmes: Each national government should formulate a national policy for the development of information systems and consider the establishment of an interdepartmental committee to coordinate information systems, approve national information systems plans and departmental information systems strategic plans, and coordinate training in information systems. The committee will organize periodical meetings where the concerned departments will present their information systems projects and their information systems strategic plans. The committee will have a permanent secretariat situated at the Prime Minister's or the President's Office. The secretariat will disseminate information on information systems and technology projects to the concerned departments and agencies. Responsibility and authority for various roles should be clearly defined:

(a) The role of establishing data standards and of distributing data collection between departments should be assigned to an existing agency, such as the Statistical Office or the Organization and Methods Office;

(b) The role of establishing the hardware and software standards should be assigned to an existing agency such as the National Computer Centre, Informatics Department, and Electronics Department;

(c) The role of maintaining information, and displaying and providing access to the available hardware, especially microcomputers, and software, especially spreadsheets and word processing packages should be assigned to an information agency.

(2) Training activities: There is a need to develop indigenous training capabilities in all countries. National and international programmes for the training of trainers are needed to achieve this objective. Assistance should be provided when requested to training efforts in the developing countries. The training of information systems specialists and information systems users is just as important for knowledge, skill, and sensitization on the use and application of information systems and technology. The role of organizing training can be allocated to various departments or assigned to an established central training institution.

(3) Documentation projects: Pilot projects should be organized in developing and developed countries to test innovative concepts in information systems and services design and use, such as the Kawasaki Campus City plan. The results of such projects, whether or not successful, should be evaluated, documented, and disseminated.

(4) Assistance activities: Assistance and advisory services should be made available to national, regional, and local agencies in developing countries. Assistance should also be provided in developing the capacity of local private sector enterprises to support public organizations effectively. The use of consultants in the development and implementation of information systems

needs to be considered.

(5) State of the art reviews: There is a continuing need for assessments of the state of the art concerning appropriate information technologies and strategies (including software, data, training, information systems management and implementation, standardization activities, methods for assessing the benefits and costs of information systems strategies, and other elements). Important topics to be covered include:

(a) case studies of implementation successes and failures;

(b) manufacturers' information on the computer hardware and software they distribute; and consumers' or users' information on the benefits and problems of using certain types of hardware and software;

(c) managerial, organizational, and social aspects of information systems, such as effective implementation strategies, the role of users in shaping implementation programmes and strategies for information transfer;

(d) disparities in economic and social effects of information systems, such as negative impacts on medium or small businesses, or on firms in rural areas, and ways in which these can be overcome either by initiatives on the part of private enterprises or by government policies;

(e) value-added networks;

(f) effective strategies for public-private interactions in providing or implementing information systems and services;

(g) the psychological and social aspects of the use of information systems;

(h) the role of information systems activities as a major tool to stimulate local and regional development, and especially how and under what conditions investments in information activities can be a catalyst to development in developing and in developed countries; and

(i) standardization activities and results, such as electronic data interchange standards for trade and transportation, geographic data standards, and others.

(6) Information dissemination: Effective mechanisms for information dissemination are essential. There is a critical need for:

(a) international networks, established to facilitate the exchange of information and experience through activities such as newsletter and data base; covering such subjects as: information technology (hardware, software, and associated services); training centres, programmes, and materials; and experts and organizations prepared to provide advisory services, as well as relevant professional organizations and activities. The establishment and dissemination of data bases in these areas (especially computerized directories) should be planned carefully. It is fundamental that such data bases be carefully managed. Attention has to be given to the collection of only relevant and reliable data as to the updating of data.

(b) biennial international congresses, such as the Kawasaki International Seminars, bringing together representatives of public, private, and third-sector organizations, from developed and developing countries, concerned with technical, management, policy, research, education, and other aspects of information systems and services.

(c) more specialized meetings of experts, and of managers and officials concerned with implementation management.

(7) Need for a single international focal point: The preceding discussion identifies needed research, training, and other activities to be undertaken by many institutions -- local, regional, national, and international -- in many countries. For maximum effectiveness, there is a critical need for an organized programme of cooperation among countries and institutions, with a single international focal organization for information coordination and dissemination. Such a focal point is also essential to stimulate international and national activities and to promote harmonization of efforts and minimize duplication and wasteful effort because of lack of knowledge of other activities of similar nature. Such a focal point provides the framework within which information transfer, delivery, and access among countries and institutions can take place.

2.2 Recommendations for UNCRD Actions

Recognizing UNCRD's mandate and aims:

(a) to serve as a training and research centre in regional development and planning and related fields for developing countries which may wish to avail themselves of its services;

(b) to provide advisory services in regional development and planning and related fields at the request of the developing countries;

(c) to assist developing countries in promoting the exchange of data on research, practical experience, teaching, and other relevant subjects in regional development and planning and related fields; and

(d) to assist and cooperate with national or other international organizations, concerned with regional development and planning and related fields;

The participants of the Second Kawasaki International Seminar on the Information Systems Challenge for Government and Business recommend that the UNCRD provide the needed organizational focal point, to take a lead role, in cooperation with other international, national, regional, and local specialized organizations.

Among the specific functions to be accomplished as this organizational focal point are:

(a) UNCRD should establish formal linkages with appropriate international organizations, central and local governments, universities, private firms, and other nongovernmental organizations, which will benefit from and support the programme;

(b) UNCRD should identify and work with national focal organizations in implementing this programme, drawing on their advice and experiences;

(c) UNCRD should establish a major programme of information dissemination, including the elements identified in previous paragraphs. To support this programme, a documentation centre should be established, providing software, training materials, research results, case studies, and hardware/software evaluations;

(d) UNCRD should work with other organizations to establish international networking activities and mechanisms for effective evaluation and rapid dissemination of appropriate software;

(e) UNCRD should assist in mobilizing financial support for needed international, national, regional, and local activities such as training programmes, research, demonstration projects, and other activities;

(f) UNCRD should provide, in coordination with other organizations, advisory services as needed to support this mission; and

(g) As part of its information dissemination programme, and based on the uniqueness and success of the First and Second Kawasaki International Seminars, UNCRD should continue to play a lead role in organizing such international congresses on a biennial basis.

PART II: SUMMARY OF PROCEEDINGS

OPENING SESSION

Tuesday, 21 July 1987, 9:30-10:20

Welcome Addresses:

Saburo Ito, Mayor, Kawasaki City

Tomoyuki Onozawa, Ministry of Posts and Telecommunications, Government of Japan

Takao Kubo, Deputy Governor, Kanagawa Prefecture

Hidemitsu Kawakami, President, City Planning Institute of Japan

Keynote Speeches:

Hidehiko Sazanami, "Information Technology and Regional Development: Challenges and Opportunities for Developing Countries."

Jean V. Salmona, "Public/Private Partnerships in Information Systems in Public Administration."

Welcome Addresses (Summary by James F. Goater)

Saburo Ito, Mayor, Kawasaki City

The mayor first extended his thanks to all agencies, organizations, and participants concerned, on behalf of Kawasaki City. He also gave a warm welcome to the assembled guests.

He then went on to link the Second Kawasaki Seminar with the First Kawasaki Seminar in 1984 which had marked the beginning of the joint UNCRD-Kawasaki City seminar project. He noted that during the intervening three years steady efforts had been made in various United Nations agencies as well as in various cities to implement the findings of the First Kawasaki Declaration. He also observed that efforts were being made, particularly in the field of technical cooperation, to further build on these achievements.

Against the backdrop of rapid technological progress in telecommunications and computers deeper interrelationships are emerging, he noted. This, in turn, necessitated a global perspective, on the part of the developed nations, to join hands in tackling the common problems faced by humanity. Internationalization, though in some cases actually causing problems, is nevertheless vital in solving the difficulties facing us in our daily life. This is the arena in which local capability development is important. Local information system development has, therefore, a vital role to play.

The mayor noted that in Kawasaki great efforts were being made to play a full role in this movement. He briefly touched on the Campus City concept, which was an original idea, aimed at defining the identity of Kawasaki City for the 21st century. He believed that greater mutual interdependence among urban organizations was vital in promoting co-prosperity and world peace. He realized the limitations of Kawasaki in this endeavour but felt that through events such as the current seminar, efforts could be further strengthened.

He concluded his speech by encouraging all participants to engage in vigorous discussions and exchange information and experience, and extended his best wishes to everyone for a pleasant and fruitful stay in Kawasaki City.

Tomoyuki Onozawa, Ministry of Posts and Telecommunications

On behalf of his ministry, the speaker welcomed the assembled participants, together with supporting agencies, organizations, as well as the private sector. He began the substance of his speech by noting the rapid expansion of information systems around us, using robots and family computers as his example.

This expansion in home computers entails wider access to information, and figures for Japan indicate a usership of ten million. Thus, information itself was becoming a commodity. This, in turn, entailed a new style of urban planning, inclusive of information systems. In revitalizing the cities into the 21st century, this new style of urban planning would have to be taken into account. The speaker went on to outline the importance of promoting information infrastructure, hardware, and software development. Accumulation of wisdom was obviously vital.

His ministry was actively working to continue developments in this field. He placed great importance on the outcome of the current seminar and awaited the results with interest. In conclusion he wished the seminar great success and thanked all present for their attention.

Takao Kubo, Deputy Governor, Kanagawa Prefecture

The speaker noted that the current seminar was building upon the achievements of the First Kawasaki Seminar in 1984. He noted that the focus was now more towards local governments and private management. He believed this area to be of particular importance for the following four reasons:

(1) City building. United Nations estimates indicate that by the year 2000 the number of cities in excess of one million will have almost doubled to 440 from the 1978 figure of 234. Rapid urbanization is creating various problems -- what measures can be taken to solve them? Information exchange, in this endeavour, is therefore of ever-increasing importance.

(2) Information. Regional disparities will emerge if there is undue concentration of information in specific centres. Measures must be taken which will mitigate against this. Multipolar societies must be developed. Thus city planning must utilize information systems in originating creative ideas to solve these problems.

(3) New international communication and cooperation. Through widened use of information and greater access to information, international ties at the local government level can be further strengthened. Information exchange will be greatly enhanced.

(4) Peace. Internationally, with greater amenities in the cities, information exchange and mutual understanding on a global scale will result. The current seminar, therefore, was playing its part in promoting peace. Information systems development therefore was important for world peace.

The speaker had great expectations for the seminar. He noted that Kawasaki City was in the process of shifting from a heavy industrial centre to a city of advanced information technology. He felt it a particularly suitable venue for international symposia such as the current one.

He closed his remarks by reiterating his welcome and thanking everyone for their attendance.

Hidemitsu Kawakami, President, City Planning Institute of Japan

Having attended the First Kawasaki Seminar, the speaker noted how appropriate the proceedings had been. He mentioned the final report of this seminar and praised its great insight and value as a reference work.

In particular, he focused on the recommendation concerning the upgrading and improvement of the urban environment. He fully agreed with the important role that information systems development had to play in this regard.

He noted that the current seminar was another appropriate response to the problems and thanked those agencies, organizations, and individuals who had joined with UNCRD to seek viable solutions. Since the previous seminar, many cities, including Kawasaki, had been attempting to implement some of the recommendations. He felt sure that the papers to be presented, together with the resulting discussions would be of great value to all concerned.

These remarks closed his brief welcoming speech.

Keynote Speeches (Summary by J. S. Edralin)

Hidehiko Sazanami, "Information Technology and Regional Development: Challenges and Opportunities for Developing Countries."

UNCRD Director Hidehiko Sazanami's keynote speech provided a useful insight into some of the potential contributions of information technology to regional development objectives. Information technology could contribute to economic development and growth in the region by creating new markets, generating investment, income, and new jobs, revitalizing industries, improving production processes and products, and promoting greater mobility in capital and financial flows and services. Moreover, information technology could facilitate a continual two-way flow of information between and among local and national development planning units, and also facilitate interpersonal communications for people in remote areas and between people in urban and rural areas. If these potentials are to be realized, policy guidelines are urgently necessary to identify the capabilities of developing countries that need to be developed or strengthened to enable them to acquire and use information technology more effectively.

The Director argued that the challenge facing developing countries could hardly be greater. The human, financial, technical, and technological capabilities in those countries are limited. The countries are generally deficient in information infrastructure, information resources, and trained information specialists and systems personnel. Aside from these problems there are other barriers to the transfer of information technology to developing countries, e.g., the cultural attitudes and values, the poor telephone, communication, and transportation services, high power costs, power shortage, labour unrest, red tape, pilferage, materialism and corruption, and the absence of auxiliary industries.

The Director concluded that the seminar offered the best opportunity for the participants to reflect upon the needs and challenges in developing and implementing information systems for regional development in developing countries.

Jean V. Salmona, "Public/Private Partnerships in Information Systems in Public Administration."

Jean V. Salmona, Director-General of both the Centre d'Etudes des Systemes d'Information des Administration (CESIA) and the Data for International Development Association (DFD), pinpointed several problems facing public administration in the use of information technology, and particularly in the design, development, and management of information systems: (a) difficulties in recruiting and keeping good information technology specialists usually due to the low level of remuneration in public administration; (b) lack of cultural tradition and competence of public administration to manage information systems projects; and (c) constraints to change in public administration.

Salmona argued that the use of information technology in public administration will succeed through cooperation between the government and the business sector. He reckoned that the business sector holds the competitive edge by being better at performing consulting activities and at developing or even managing information systems, more efficient in the production of hardware and software, and more effective in building and managing data banks for commercial use. Such activities may be performed more efficiently by the business sector, and therefore they may be suitable for contracting out or selling to the business sector, said Salmona. He identified the key areas where the government can keep full control.

In conclusion, he said that competition and competitiveness are the prerequisites and absolute conditions to efficiency in information systems.

SESSION 1: THE CHALLENGE OF INFORMATION SYSTEMS TODAY

Tuesday, 21 July 1987, 10:40-12:30

Moderator: Romeo H. Gecolea

Rapporteur: James F. Goater

Speakers:

Marvin L. Manheim, "Using Information Systems to Compete Successfully in Today's World: A Challenge to Managers."

Hidemitsu Kawakami, "The Theory of Urban Environmental Master Plan for Kawasaki City and the Development Guiding Principles for the Plan's Supporting Information System."

K. V. Sundaram, "Changing Data and Information Needs for Agricultural Planning: The Challenge for the Developing Countries."

Takao Hirosawa, "Urban Planning in an Information Society."

Koji Morooka, "Future of Regional Medical Information Systems."

Discussants: Sidney W. Witiuk
Takeo Imai
Shinroku Tsuji

Presentation of Papers

Marvin L. Manheim, "Using Information Systems to Compete Successfully in Today's World: A Challenge to Managers."

On the premise that all concerns are basically seeking competitive advantage, Manheim asserted that: (a) Information Systems and Telecommunications (IST) is a strategic weapon, not simply a means to enhancing efficiency; (b) to be effective, technological change must be managed as people change; (c) systematic methods are available for managers to use in order to develop an IST-based strategy and implementation plan; (d) the most effective training programme is one which is designed as an integral part of an overall strategy implementation programme.

Numerous examples were cited of businesses successfully adopting information systems to increase their market share. The same principle can be applied to the public sector. The challenge for managers is to take advantage of the opportunities presented by IST -- to be creative and effective. In the global competitive economy the secret of development is to formulate a successful strategy -- everywhere, consideration must be taken as to how to be successful. Competition is the major issue.

The paper proposed a fourfold methodology for strategic management using IST:

(1) diagnosis and assessment -- the strengths, weaknesses, opposition, threats, etc.;

(2) strategy formulation and analysis -- strategic options, evaluations of competitors, etc.;

(3) strategy adoption and implementation planning; and

(4) the never-ending process of implementation, monitoring, and adjustment.

The user support system, not only software and hardware is very important. The human dimension is essential as it is through people change that IST adoption can be most effective. In changing the way people work, combatting the fear of change, etc., information systems adoption must be seen as a positive opportunity. In parallel, human resource training is vital. As a part of a total competitive strategy, the very organizational culture of a concern must be changed. As a device for emphasizing the core issues of the paper, Manheim restated the opening four points as his conclusion.

Hidemitsu Kawakami, "The Theory of Urban Environmental Master Plan for Kawasaki City and the Development Guiding Principles for the Plan's Supporting Information System."

Kawakami had been involved with the Urban Environmental Master Plan of Kawasaki, 1983-85. His paper attempted to introduce the theory of the function of the supporting information system in the planning process, together with the role that planning information played. It was noted that this still had some shortcomings.

Referring to a schemata of the Master Plan, a brief description of the functions was given. This covered: Function as preliminary assessment and adjustment; function as demanding new project planning; and monitoring.

Goals were outlined, together with basic operations. It could be seen that at the base of the schemata was the supporting information system of the plan. The significance of this was discussed -- a whole range of data such as national census, office statistics, industrial statistics, etc., grouped into four sections (government statistics, daily business statistics, regularly generated specific data, and irregularly generated data) played a part in organizing the operations of the environmental master plan for the city.

Discussed briefly were the function of the supporting information system of the plan and the range of data processing; then the requirements of this system.

In concluding, Kawakami outlined briefly the theory of planning information, i.e., all the inherent information necessary for city planning, outside ordinary city information. This necessarily included a wide range of information -- roads, parking space, and comparative information.

K. V. Sundaram, "Changing Data and Information Needs for Agricultural Planning: The Challenge for the Developing Countries."

Sundaram gave what he termed a planner's perception and perspective on the challenge of information systems. He noted two changes, viz., change in planning orientation, and planning is no longer top-down, it is multilevel in emerging style. Thus is generated a huge integrated data requirement -- planning has become information oriented with a great need for microdata; planning has become area-specific as well as people-specific. Thus planning has to be aware of these changes in order to be effective. Perennial constraint of time, and various data processes (storage, collation, and retrieval) must fit in with the overall planning process. Flows must be swift and information structures must match authority structures. A six-step approach is suggested to produce a coherent strategy: (a) identify multilevel data/information needs; (b) institute adequate project-level data collection arrangements; (c) ensure that information structures match authority structures; (d) set up appropriate network of microcomputers linked to central mainframe; (e) modular and staged approach taking into account various constraints of developing countries; (f) devise suitable training programmes for relevant personnel, along the lines of an integrated approach.

Sundaram noted a general failure in the developing countries regarding step (a), blaming planners as well as governments. More specific minimum data requirements should be laid down by planners.

Two possible approaches to the establishment of information systems for planning for the developing countries were then suggested: A non-specialized general purpose system, and a specialized information system, to suit specific programme/project formulation during the action phase of planning.

The modular, stepwise approach was outlined as being most appropriate for a variety of reasons, chiefly the wide diversity of outputs possible, the smooth transition from existing technology, and optimum utilization of existing skills and equipment.

Thus, if the purpose of development is to develop Man, then argued Sundaram, training becomes the most crucial component. The integrated approach is most useful for this purpose, whereby all actors in a particular development scenario are brought together in a training course for mutual benefit.

The triangular cooperation between governments, international institutions, and the private sector could, by working together, combine to surmount the challenge.

Takao Hirosawa, "Urban Planning in an Information Society."

Hirosawa explained the involvement of the Ministry of International Trade and Industry (MITI), Government of Japan with city planning -- or "How Cities Should be in the Year 2001." In the movement from industrial to post-industrial society, cities are becoming more information oriented and taking on new roles, i.e., incubators for new ideas in lifestyle changes, information cultures, and comprehensive centres for working, rest, and leisure activities. Information plays a vital part in establishing new roles for cities. Kawasaki is involved in new research activities, information related industries, and information systems design. In information culture development, software accumulation is important. Housing should be closer to workplaces; community plazas with multipurpose residents' terminals can be established. Integrated area management systems, e.g., medical information systems, are important. The above represented just some of the ways that information oriented cities could be developed into the twenty-first century. Quoting from an Interim Report (MITI?) which noted that information systems in enterprises are moving away from centralized systems to more personal systems, Hirosawa affirmed that cross-border networks are being established between companies and clients; relationships can depend upon information networks. At this point, he noted that network security is very important. He also raised a warning against excessive concentration of information into specific centres, e.g., Tokyo or Osaka which would necessitate the establishment of dual systems. Regional industrial development, industrial dispersion, and a rationalization of transportation become possible.

With regard to human resource development, a perennial shortage of qualified personnel was noted -- particularly a large-scale need for information engineers. Cities are in competition, hence information technology adoption relates to the availability of qualified labour. Advanced information services require trained personnel, the supply of which could determine the location of businesses. In conclusion, Hirosawa added that MITI anticipates the growth of cities along these lines, together with the spread of such cities.

Koji Morooka, "Future of Regional Medical Information Systems."

Morooka provided a detailed account of the future of regional medical information systems. As industries moved from secondary to tertiary and into service sector it became logical that information systems, i.e., medical information, grew increasingly relevant to the hospital service. Utilization of information technology limits the amount of time wasted and rationalizes hospital procedures, thereby greatly increasing all round efficiency.

Through a series of illustrative and schematic slides, Morooka introduced a detailed portrayal of how information systems incorporated into a hospital/medical network could greatly streamline the operations. Examples included information storage procedures on patients, optical data storage techniques, X-ray storage, information system support for administration, robot dispensing, at-home examination of patients, and information linked hospital networks (example from the United States).

The underlining issue to this presentation was that through the development of high quality data and the utilization of information technology, the hospital procedures could be greatly improved.

Discussions

The discussion generated by these presentations firstly focused on the presentations by Manheim and Sundaram. Sidney W. Witiuk noted that profitable material had been presented; he also emphasized that IST in addition to being a device/tool, was also valuable at the tactical/operational level. An intriguing question in the area of human resources was posed, viz., what happens to personnel who cannot adapt to the introduction of IST (i.e., the casualties)? He noted that a strategy must precede training for new products, but that some training was also necessary to precede a new strategy. Another question concerned what rate of change could be accommodated by a given organization? Multilevel planning existed in large corporations and government departments. He also noted that changing job procedures/ descriptions within government departments, as advocated by Manheim was probably more difficult than in private concerns. Two additional questions centred on how difficult was the necessary change, and is there any measurement necessary?

The discussion then moved on to Morooka's presentation, via discussant Takeo Imai who agreed with the paper's concentration on health information systems, which he believed vital and of fundamental importance for all. He bemoaned the seeming low priority given to this area by governments in the developing countries compared to other sectors, i.e., business, defense, etc.

The discussant widened the terms of reference beyond those previously set, to include rural to urban as well as city-based information systems and observed that, in terms of health information systems there was a great need to improve the existing intravillage communication system to a level equal to the current standard of international telecommunications. There was a prime need for infrastructural improvement before health information systems could be effectively utilized.

The third discussant, Shinroku Tsuji, noted that the papers had dwelt significantly on the human dimension and noted the obvious correlation between an abundance of trained personnel, and an adequate information system usage. He questioned the kind of impact that the IST approach is able to measure, noting that the more advanced a system is, the more negative are the interactions which can occur between it and other systems. He noted that humans can adjust to changing environments but not quickly -- in adopting new technology, original objectives may be forgotten.

The moderator (Romeo H. Gecolea) responded to selected points and requested responses from the relevant speakers or discussants. Manheim noted that through an integrated action programme casualties can be reduced. He said that the people who will be affected by the new information systems should be involved before the systems design is changed, although he admitted that some casualties would nevertheless be generated. He observed that through the diagnosis stage of his methodology the amount of change necessary could be determined. He noted also that the stimulation of a climate of change was essential, which could, in turn, be the basis for long-term change. Microcomputers clearly have an important role.

Witiuk added that Statistics Canada has reported no lay-offs due to internally generated factors and also that the corporate assignment programme limited resistance to change.

Sundaram, for his part, noted three major constraints which he had consistently observed during the course of his work: Managerial resistance to change; organizational rigidities, and over-reliance on time-tested ways of doing things. He agreed that the establishment of a climate of change was vital and that the achievement of a breakthrough was a key issue. He said that additional emphasis should be placed on the importance of user-learning. He repeated his assertion that very large information requirements had made problems seem intractable. He divided essential information needs into six sectoral categories, and listed relevant agencies and institutions who could feasibly be called upon to produce essential data. There were distinct data requirements from the agricultural, industrial, infrastructural, social services, human settlements, and environmental sectors.

SESSION 2: INFORMATION SYSTEMS OPPORTUNITIES

Tuesday, 21 July 1987, 14:00-15:20

Moderator: Michael Batty

Rapporteur: Itoko Suzuki

Speakers:

Richard E. Klosterman, "Microcomputer Technology and Regional Planning: Prospects and Challenges for the Developing World."

Yojiro Inoue, "Using Information/Communication Systems for Regional Promotion."

Takayasu Matsuzaki, "An Approach to a Renovated Educational and Training Programme for an Information Society."

Shinroku Tsuji, "Development of Small- and Medium-Sized Companies by Strategic Use of Information Technology."

Discussants: John B. Rose
Frank le Clercq
Hideki Kaji

Highlights of the Presentation of Papers

Current information systems and technology provide enormous and substantial opportunities and challenges to citizens and public and private organizations. Microcomputer technology provides better opportunities for computerization of organizational and human functions. But these opportunities also create inefficiency or misuse of technology and systems. They create increased requirements for changing methods or more data collection. These instances call for an appropriate strategy for using information technology.

Increased use of information and communication systems also enhances opportunities for reducing regional gaps and for bringing about regional economic growth. Such regional vitalization further facilitates the concentration of new media network operating interregionally, and as a consequence provides better quality of life to residents, and creates the need for better local government services.

More concretely, computer software generates methodologies for education and training, regional planning, and community services, and for dealing with the different concepts and value systems of the users. Easy access to data bases, networking, telecommunication, and teleconferencing provides opportunities to the educational, industrial, agricultural, and social and community development sectors, for which both private and public sectors are required to work harmoniously.

Computer-based training and educational programmes can be created effectively by bridging gaps among various related and concerned sectors such as governments, industries, researchers/educators, and learners/recipients through constant dialogue. These educational and training programmes can play an active role in increasing the skills required by the information society.

Development of information technology provides numerous opportunities to the private sector as well, particularly the industrial sector. It provides overall increased productivity and structural change in the industrial sector, which is still in process. Strategic use of information technology, particularly by the small- and medium-sized industries in Japan, has given rise to the profitable and joint and cooperative use of technology among enterprises.

The use of information technology, nonetheless, brings about the information society in which individuals and organizations are threatened by their vulnerability, particularly as a result of the coded society, increased interdependency, loss of flexibility/ample time as a result of real-time processing of information. These problems are comparable to the pollution problem at the time of industrialization. To reduce such problems, the information society has to pay the cost of creating back-up, parallel, or blocking systems.

Given such opportunities and cautions presented by information technology, managers of government and business organizations have to assume greater responsibility in organizing appropriate strategies for effective use of emerging information technology. Managers have to be clearly aware that information technology is providing a new set of social infrastructure.

Public sector managers have to provide the basis for healthy competition among enterprises. Cooperation between public and private sector management will become increasingly important in human resource development and training for the advanced information society.

Discussions (Summary by J. S. Edralin)

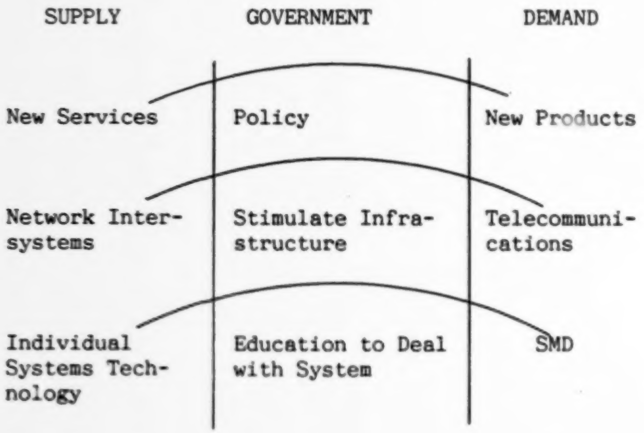
Several themes emerged from the Klosterman, Inoue, Matsuzaki, and Tsuji presentations. The moderator (Michael Batty) outlined the themes: (a) the use of information technology and the actual infrastructure and how it is appearing within cities; (b) the use of information technology to enable economic growth and economic change; (c) the use of information technology to actually design the new information technology and the new infrastructure. Relating to these themes is the appropriate organization (the organization "orgware"), which is likely to be more important than the hardware and software in the next couple of decades.

John Rose emphasized in his comments, the Klosterman presentation. On the use of the applications softwares, the problem is that such softwares are not really independent as far as the user is concerned. In general, the user will need to use the existing models, data base, statistical analysis, and graphics function. Another problem is training and sensitization in the use of the softwares. Training is important, but it is also necessary to ensure that softwares are made more user friendly and are integrated with other functions. In order to meet this need, it is essential to build up practical experience and infrastructure, test the different software packages, or even develop softwares. Cooperative efforts such as clearinghouses and cooperative training would also be useful.

Commenting briefly on Matsuzaki's presentation, Rose asked if IBM had any practical, technical plans or projects which could be developed as models for use in different countries. He also asked for some clarification on what countries are involved in the programme, how the countries are cooperating in the programme, and what the role of IBM is.

In response to these questions, Matsuzaki stated that IBM has been supporting some experimental educational and training programmes in information technology in eighteen countries. In the Philippines, the SEAMEO Regional Centre for Educational Innovation and Technology (INNOTECH) has developed and introduced a language and technology educational programme in one elementary school. In Japan, twenty elementary and high schools have introduced a language and technology educational curriculum. A communications research network linking universities has been established. Moreover, a Pacific network linking the United States and Japan has been established.

In his comments, Frank le Clercq pointed out a common theme of the four presentations, i.e., how to bridge the gap between the possibilities and opportunities offered by information technology and the users' needs. He introduced an integrated technology marketplace scheme in which the government plays an important role in formulating an information technology policy, creating infrastructure, and establishing a technology-based educational system.



SUPPLY	GOVERNMENT	DEMAND
New Services	Policy	New Products
Network Inter-systems	Stimulate Infrastructure	Telecommunications
Individual Systems Technology	Education to Deal with System	SMD

In his comments, Hideki Kaji suggested the need for some safety measures to counter what was seen as potential weak points of the information society.

SESSION 3: COMPARATIVE INTERNATIONAL CASE STUDIES

SESSION 3.1: INTERNATIONAL INFORMATION SYSTEMS PROJECTS

Tuesday, 21 July 1987, 15:40-17:00

Moderator: John Lindsay

Rapporteur: Monte Cassim

Speakers:

Romeo H. Gecolea, "Information Systems for Rural Development."

Jean V. Salmona, "Strategies for Developing and Implementing Information Systems in Public Administration: From Classical Informatics to New Information Technologies."

Sidney W. Witiuk, "Promoting Spatially-Oriented Referencing Systems Development at the International Level."

Sukehiro Gotoh, "A Global Environmental Information Network: INFOTERRA."

Discussants: Christian P. Averous
Yoshinobu Kumata
Koji Morooka

Presentation of Papers

Romeo H. Gecolea, "Information Systems for Rural Development."

Centring on the project level, the presentation opened with a brief outline of three rural development projects in developing countries in Asia. These projects indicated the nature of the problems faced in establishing information systems for rural development in developing countries as follows:

(1) In country X: The case of two districts, where millions of dollars were spent on a multisectoral rural development project. Although the districts were small (<50,000 families) ten years later, it was not possible to determine with any level of confidence the social and economic impact of the project.

(2) In country Y: The case of a family planning programme where resources were directed at education and publicity programmes, negated by the fact that awareness and motivation had been high for some time nationwide. Thus, the investment could have been better directed at establishing the implementation infrastructure for family planning services.

(3) In country Z: The case where on-site checks, carried out quite late in the life of a project showed that a rural health project which appeared to be proceeding well was actually not so. This was because health workers, who did not visit the village as often as they should, seemed to have fabricated reports.

Indicating that the presentation focused on information systems (IS) for management decision support, Gecolea noted that although the scope was broad, in the sense that the coverage was national, it was also narrow in regard to sectorally specific areas. In addition, there were spatial implications (e.g., regional information) to be considered.

Among the important functions that IS should perform, Gecolea indicated the following: (a) The system(s) should produce the intelligence on which the very objectives of the project will be based; (b) The system(s) should permit the monitoring of information on the project; (c) The system(s) should enable the measurement of project impacts.

He went on to identify contextual features affecting IS design for rural development projects, viz.: (a) Information systems are not seen as management tools at present; (b) poor human infrastructure, i.e., dearth of personnel in both quantitative and qualitative terms; (c) poor physical infrastructure, e.g., where lack of adequate transport and communications systems can adversely affect the collection of data and their validity; (d) budgetary limitations (in developing countries).

In regard to IS design considerations, the following points were stressed: (a) user participation, requiring both users' education and their active participation in IS design and implementation; (b) clear definition of system objectives; (c) prudence in parameter selection, noting that with computerized systems there is a tendency to be extravagant and parameters are increased based upon the increased processing capability without adequate consideration of the increased cost this entails; (d) ensuring validity of data by improvements to the collection system, including well-designed questionnaire formulation, training for data collectors, and user involvement in data collection; and (e) ensuring the use of system outputs, with the awareness that data has to be transformed into information to be of value.

In conclusion, Gecolea warned against thinking that electronic data processing alone is important. Noting that it constituted only one part, he stressed the importance of the many steps before and after data is processed in an IS.

Jean V. Salmona, "Strategies for Developing and Implementing Information Systems in Public Administration: From Classical Informatics to New Information Technologies."

The role of public administration (PA) in recent years was observed to have grown with: (a) the complexity of economic activities; and (b) increased public demand for services. On the other hand, if PA is viewed as the overheads of managing a nation, these costs cannot be allowed to increase if viability or profitability is to be maintained. Thus, while PA tasks are growing, PA budgets are decreasing. This requires PA productivity to increase faster than economic productivity (which should not be difficult because PA efficiency is low at present). This constitutes the context for the use of information technology (IT) and information systems (IS) development for PA.

IT has been used in PA over the last twenty years without much change in productivity. This is largely because of: (a) pressure from hardware and software vendors, whose products do not necessarily coincide with actual PA needs; and (b) institutional weaknesses in the PA system.

Information used in PA may be broadly categorized as: (a) large management information systems, which are still necessary today, and which have to be logically (though not necessarily physically) centralized; and (b) networked decentralized information.

Regarding the organization of information in PA, it was observed that centralized, isolated large management systems alone are no longer adequate. Rather, the increasing need is for a large network of institutions and systems which have to communicate with each other. The transition from centralized systems to a network of work stations was indicated through overhead projector slides.

The major issues which need to be addressed are as follows:

(1) Standards setting:

  (a) Network standards: The communication requirements among networks imply that any new hardware that is bought should be compatible with the existing system;

  (b) Data standards: Standards should be maintained at national level (e.g., ESCAP suggested formats) and among different entities within a country (e.g., individuals, enterprises, and buildings). This would permit only one entity to be approached for one set of data requirements, thereby cutting down costs;

  (c) Software standards: Basic application software could be exchanged among different entities, whereby each user would attempt to tailor it to suit specific needs.

(2) IS design and implementation requirements in an organization:

  (a) Methodologies are required for IS design and implementation and for other purposes (e.g., preparation of terms of reference and call for tenders). In order to adopt a unique methodology in one organization, it is essential to introduce a common culture among IT specialists and users in the organization;

  (b) Organizational structures and related procedures should evolve as IS are developed and current procedures should be analysed and evaluated;

  (c) Information resource management (IRM) applies to all activities related to information in the organization and is especially advantageous in budgetary programming and allocation;

  (d) Among the practical ways of developing and implementing information systems, bringing awareness to and the training of users, an "information technology sector" (within the organization), and providing users a choice of various hardware and application software, as well as the opportunity to develop their own application software (via, for example, user-friendly fourth generation languages) were mentioned.

In conclusion, Salmona noted that relatively simple technologies had changed PA across distance and time. In France, all businesses are expected to be computerized by 1992, and by 1995 all civil servants are expected to have their own work stations. Value-added networks (VAN) will permit data exchange between enterprises and PA, reducing time-consuming work such as filling out forms. Over the next few years, technological change is likely to transform PA more than it has done over the past century.

Sidney W. Witiuk, "Promoting Spatially-Oriented Referencing Systems Development at the International Level."

Witiuk presented an overview of the scope of activities of the Spatially-Oriented Referencing Systems Association (SORSA) in regard to its role in promoting the development and use of such systems throughout the world.

SORSA is a nonprofit international association of individuals (not countries), established in 1974 in San Raphael, France, and its aims are to: (a) promote the application of spatially-oriented referencing systems; (b) facilitate communication, disseminate experience, and promote cooperation among organizations and professionals in the field; (c) promote the development of spatial referencing, retrieval, and analysis; and (d) encourage transfer of relevant standards and technologies among countries. The association has no permanent staff and is manned on a voluntary basis. It has 150-200 members from twenty-nine countries.

Going on to an outline of spatially-oriented referencing systems, Witiuk stressed that computerization was not a prerequisite. However, today there is an increasing tendency towards automation, particularly in view of the cost-effectiveness resulting from developments in the field of microelectronics. Specifically, these systems perform data capture/encoding, verification, aggregation/disaggregation, retrieval, tabulation, and specialized packaging of data that is referenced to some geometric and/or topological framework. Common applications include: (a) computer mapping and cartography; (b) urban and rural planning; (c) emergency service dispatch; (d) districting; (e) allocation/distribution modelling; (f) routing/navigation; (g) address or postal code geocoding; (h) environmental inventory and impact studies; and (i) utility network modelling.

SORSA's current programme of activities include: (a) direct involvement in specific projects or training activities; and (b) enabling timely access to information support tools. Each of these areas may be outlined as follows:

(1) Direct involvement: This can take place in four ways, viz., (a) contracted consultation (undertaken for external agencies), (b) direct sponsorship of projects (with SORSA's own limited funds as well as by canvassing assistance from larger organizations), (c) local expert assistance (provided by the SORSA membership as well as suitable persons outside), and (d) knowledge

sharing (typically restricted to members, but with a long tradition of inviting colleagues from developing countries).

(2) Information support tools: Existing tools include: (a) bibliography related to spatial information; (b) information and demonstration centres; (c) video tape based training courses; (d) demonstration (prototype) systems; (e) calendar of events data base; (f) information dissemination (through a quarterly newsletter, working papers, seminars, and workshops); and (g) formation of special interest working groups (nine exist at present).

SORSA's role in facilitating communication and cooperation among its membership, affiliates, and developing countries were shown on an overhead projector slide.

SORSA's activities planned for the near future include: (a) a global inventory of relevant curricula; (b) a glossary to standardize terminology; (c) revision of software inventories (produced by international organizations such as the International Geographical Union (IGU) and the International Cartographic Association (ICA); (d) expanding its work on establishing guidelines for spatially-oriented referencing systems; (e) expanding the inventory of professionals (also in collaboration with ICA and IGU); (f) participate in a series of comparative studies (especially in regard to developing countries); and (g) the development of benchmarks (to assess alternative systems for handling spatial data).

Sukehiro Gotoh, "A Global Environmental Information Network: INFOTERRA."

Gotoh's presentation centred on a unique information system, global in scope, developed by the United Nations Environment Programme (UNEP). INFOTERRA was described as a "referral" system (a two-step process), where information sources are identified as the first step, after which the exchange of substantive information is sought. In fact, when first established in 1975, INFOTERRA was called IRS, the acronym for International Referral System.

The system centres around government designated focal points in 127 countries, now representing 98 per cent of the world's population, and more than 5,500 sources of environmental information. These national focal points (NFP) select expert institutions within their countries to act as sources of information, compiling these sources into a national register of environmental expertise. In addition to national users, the NFP also serves the international community, selecting certain sources for INFOTERRA's international network.

Once the NFP has established that a source meets the qualitative and access requirements demanded by the INFOTERRA international network, it forwards the necessary details to the Programme Activity Centre (PAC), located within UNEP in Nairobi. The PAC enters all details into a computerized file known as the International Directory of Sources of Environmental Information, from which magnetic tape and hard copy versions of the INFOTERRA Directory are produced.

The basic concept underlying INFOTERRA, a linking mechanism, is represented by a double (figure-of-eight) loop (see the speaker's paper, figure 1), which involves four procedural steps, viz.: (a) The user submits an environmental inquiry to the NFP requesting a search of its Directory for appropriate sources of information; (b) The NFP responds to the request by providing the user with a list of sources, each annotated with details, subject area and geographical coverage, and conditions for the provision of information; (c) The user directly contacts sources selected from the above list requesting the appropriate information; and (d) Sources then provide the user with the requested information, in accordance with their own conditions of operation.

Gotoh illustrated the above with the (hypothetical) example of a local government authority in Japan (an INFOTERRA user) seeking information on the control of toxic substances in India (after reading about the Bhopal disaster in the newspapers). The user looks through a Thesaurus of Environmental Terms Provided by the PAC for, say, the key term toxin, and refers to an index which identifies Indian institutions dealing with toxins. A request to PAC will then initiate an on-line computer search of the INFOTERRA data base located in the PAC in Nairobi for further details.

Thus, users may contact an NFP in their own country, in other countries, or the PAC in Nairobi under the INFOTERRA system, which although inaugurated as a referral system, has now developed into a direct supplier of information. Another service area increasingly appreciated by the user community is represented by the Special Sectoral Sources (SSS) of information. Requests for SSS are channeled through the PAC to an internationally recognized institution qualified to integrate many aspects of the problem area into a packaged response. In this manner, comprehensive analyses can be conducted and the findings presented to users.

As the quality of the information provided determines the credibility of INFOTERRA, the system has introduced quality control in its selection and re-registration of sources, on the basis of continuous user satisfaction studies.

Discussion (Summary by James F. Goater)

Averous' discussion was structured around two questions. The first was directed at Gotoh's presentation and the second at Salmona's.

Firstly, the discussant wished to know exactly who was utilizing the INFOTERRA system. Was it more public or private institution; developed or developing countries; national or international users?

Secondly (to Salmona), he wished to hear a comment on the cost-effectiveness of information systems involving networks. He suggested that this comment could be by way of a concrete example.

Kumata commented on two points, firstly with reference to Gecolea's presentation. Observing that while technologically, information systems can go on being developed and refined infinitely there are obvious social expenditure constraints. Whether or not local people in a particular environment actually desire information systems infrastructure is an important consideration. This obviously relates to the training of local-level personnel. He wondered what observations could be forthcoming from the speakers, on this issue. Secondly, a question directed at Salmona, the discussant wondered if there was a definite information system policy in France vis-à-vis decentralization or centralization. He noted that in Japan the trends seemed to oscillate between the two extremes, a course which could lead to wasteful investment.

The third discussant, Morooka, briefly commented on each presentation highlighting what he considered to be the most important issues in each paper. Gecolea's paper mentioned the functional aspect of information systems. Morooka noted the importance of functional development in addition to functional control -- already in widespread operation in Japan. Salmona's paper had touched on the issue of standardization, which the discussant regarded as an issue of great importance, particularly in order to cut down on waste. The Inter-Computer Networking Standard outlined in the presentation was of growing relevance. In Japan the goal of complete information systems standardization was a vital one to achieve. Morooka was attracted by the activities of the Spatially-Oriented Referencing Systems Association and its role in promoting the use and development of such systems throughout the world, as described in Witiuk's presentation. Although, unlike Japan, Canada was blessed with abundant space he felt that Japan could still develop a space-oriented information system such as this. Finally, as regards Gotoh's paper, the discussant was likewise attracted by the UNEP-developed INFOTERRA which was a global source of environmental information centred in Nairobi. He felt that such a broadly distributed information system should be introduced in Japan.

A question from the floor concerned the user-base of the INFOTERRA system. The questioner, Michael Phillips noting that his own country, Australia, had a similar arrangement, wondered whether the figures provided in the paper showed a favourable cost-benefit analysis. He sought comments on this.

In response, Gotoh answered the question from Averous by stating that the largest users of INFOTERRA were governmental(46 per cent); other users were industries/research institutions and universities. Among developing nations, universities were the largest users (40 per cent), with governments (34.2 per cent). Industries constituted just 11 per cent. He also noted that, in a practical sense, sources (of information) and users were the same. In answer to Phillips, he agreed that usage of INFOTERRA was indeed low -- he attributed this to language difficulties particularly in the case of Japan -- but noted that UNEP conducted its own periodic cost-benefit analysis. He was unable to supply figures at that time.

Salmona's response concerned the cost-benefit analysis of his system. Having noted the enormous cost of conventional noncomputerized information systems, he detailed the savings in expenditure which installation of even simple computerized systems could produce. By way of concrete examples (school meal provision in a small French municipality and land cadastres at the local government level in France), he demonstrated effectively the increased productivity and expenditure/investment savings possible with careful adoption of new information technologies.

The moderator concluded the session by observing that it was through combinations of different information packaging and distributing mechanisms that really opened up advantages. Perhaps one of the greatest problems faced was at the individual level, i.e., what information do we need, in order to know what is going on? Noting that time constraints had entailed a number of gaps occurring in the presentations, e.g., electronic mail and bulletin boards for communication, he suggested the setting up of a notice board, by the conference organizers, for display of relevant material in this field. He also suggested that the proceedings of the seminar, when published, should perhaps include a list of relevant newsletters, essential for keeping up-to-date in this field. With these observations, the moderator John Lindsay closed the session.

SESSION 3.2: INFORMATION SYSTEMS PROJECTS IN DEVELOPING COUNTRIES

Wednesday, 22 July 1987, 9:30-10:40

Moderator: John B. Rose

Rapporteur: Roswitha Newels

Speakers:

Yu Hong, "The Training of Chinese Intermediaries and Users of DIALOG, ORBIT, ESA-QUEST and BRS On-line Information Retrieval Services."

Arporn Chanchareonsook, "Information System Project for Urban Planning at the Bangkok Metropolitan Administration."

Suroso Moersidi, "The Remote Sensing System and Digital Processing for Regional Planning and Urban Monitoring in Indonesia."

Discussants: John Lindsay
Richard E. Klosterman
Teitaro Kitamura

Presentation of Papers

Yu Hong, "The Training of Chinese Intermediaries and Users of DIALOG, ORBIT, ESA-QUEST, and BRS On-line Information Retrieval Services."

The presentation focused on the training of Chinese intermediaries and users of DIALOG, ORBIT, ESA-QUEST and BRS on-line information retrieval services as carried out since 1980 by the present China Building Technology Development Centre. The training has been carried out mainly through China's own efforts and could be described as a self-reliant training provision effort.

Two types of training are provided (see table 1). These were identified and designed based on the training policy and philosophy noted below:

(a) In order to popularize international on-line information retrieval in China, administrators, directors, and managers of scientific and technical organizations and institutions of higher learning have to know about the existence and usefulness of international on-line information retrieval service and have to consent to pay for using it, i.e., they are the decision makers in regard to the use and future use of international on-line information retrieval. It is extremely important to win support from top management.

(b) The quality or usefulness of search results is not the skill in operating a computer terminal but the quality of the formulated search strategies. Therefore, the crux of the training of intermediaries and experienced users is how to make them master the methods for formulating high quality search strategies.

TABLE 1. TYPES OF TRAINING

Type of Training	Target-Group/Number of Trainees	Objectives of Training/ Course Content	Selection Criteria	Curriculum Materials	Organizer	Duration/Cost	Frequency	Location	Number of Trainees
Type I: Public Lectures	Administrators, directors, and managers of scientific and technical organizations and institutions of higher learning, i.e., decision makers Number of trainees: 100–400	Teach what international on-line retrieval is, i.e., why and when to use it or not; i.e., popularization of the international on-line information retrieval Course Content: Popular science report on the existence, usefulness, cost of the international on-line information retrieval services	Administrators, directors, and managers of scientific and technical organizations and institutions of higher learning	Only lecture notes, no distribution of materials Facilities needed: blackboard/ microphone	Institutes of scientific and technical information of provinces and large cities Local branches of the China Society of Scientific and Technical Information	0.5 day	On Request	On Site	One
Type II: Advanced Seminar	End-users or potential end-users, teachers, post-graduate students of universities/colleges Number of trainees: 60–100	Promote the full and effective (including cost-effective) use of the installed international on-line information retrieval terminals Course content: Systems and data bases in use, teach use of thesauri and classification schemes, analysis of search topics, selection of search themes, formulation of search strategies	Some knowledge of information science, able to read English, some knowledge of basic science	Textbook, directions for searching in data bases used printed sheets with search topic examples Facilities needed: Blackboard, overhead projector/ transparencies, text book, relevant thesauri/classification schemes		Beginners: 5-6 full days, US$10-20 per day plus travel + daily subsistence Experienced users / intermediaries: 8-10 full days			One to tw

After the target groups were identified and training objectives set, the curricula were identified and prepared. The speaker briefly introduced then the curricula of the training courses.

The achievements in regard to training are threefold:

(a) Since 1981, the total number of trainees has reached 3,000 for the Type I course and 800 for the Type II course. Some 100 former trainees are now acting as trainers themselves.

(b) The number of searched topics has amounted to more than 2,000, the number of searches in different data bases on different systems has amounted to about 10,000.

(c) Part of the trainees have now become sponsors of their own training courses, therefore a high spread-effect of the training efforts undertaken can be noted.

The main lessons learned out of this training effort are:

(a) it is important and extremely necessary to win support from top management for the promotion and use of on-line information retrieval.

(b) in order to make full use of an information retrieval system, training of intermediaries and users is indispensable, as the key to full and cost-effective use of such system lies in the users' education and training.

(c) the two training methods used have proven effective and through a "throwing a snowball," i.e., trainers' training approach in the case of the Type II training course, a rapid increase in the number of intermediaries and users of the international on-line retrieval services in China has to be noted.

The issues for consideration nevertheless are:

(a) though the objectives of the training programme have been achieved, with more adequate financial aid from and regular consultation with the systems vendors and data base producers the achievements might have been greater.

(b) generally, a lack of microcomputer systems with computer-assisted on-line training packages providing programmed instruction and practice for on-line search training due to financial difficulties, has to be recorded.

(c) due to financial constraints or the cost involved in the use of on-line systems, trainees lack further practice in the use of the systems.

(d) priority has to be given to the development and implementation of national computerized information retrieval systems in order to develop national science and technology; at the same time, full use of international on-line information system services should be considered as an important supplementary means.

Arporn Chanchareonsook, "Information System Project for Urban Planning at the Bangkok Metropolitan Administration."

Arporn outlined in her presentation how computerized or manual information systems are functioning and used as essential management tools for urban planning and monitoring by the Bangkok Metropolitan Administration (BMA), especially by the City Planning Division. She highlighted the need for computerized information systems for urban planning and monitoring as experienced by the City Planning Division. Information systems are considered as essential management tools for urban planning and monitoring and are gaining increasing recognition as such.

Table 2 shows the information systems projects for urban planning and monitoring purposes that have been implemented or are ongoing at the BMA.

Recognizing the need for a computerized land information system covering the areas of taxation, registration of property, public utilities, planning of flood control and drainage, and planning and management for urban development, the BMA initiated during 1984 the Land Information Systems Project. Several initial pilot projects could be carried out with overseas financial and technical assistance, namely:

(a) Canadian International Development Agency (CIDA): Pilot Project on a Computerized Land Information System for BMA

(b) Australia: Pilot Project on Large-Scale Mapping and Urban Land Information System

(c) Japan International Cooperation Agency (JICA): Topographic Mapping of the Bangkok Metropolitan Area

(d) World Bank/Australian Development Assistance Bureau (ADAB): Land Titling Project, Urban Mapping

(e) Belgium: Computerized Mapping for the City of Bangkok

Therefore, it could be noted that the City Planning Division is entering a phase of increased use of information systems (moving gradually from manual to computerized systems) for urban planning and monitoring purposes. The City Planning Division fully recognizes that the management of urban information systems through the use of the existing manual systems is increasingly becoming incompatible with the work to be undertaken, hence, it is gradually introducing and adopting computerized information systems. The short-term projects to be implemented deal with a computerized system for the Research Unit, BMA, and a pilot project for urban mapping, Mapping Section, BMA.

In the long-term, the Computerized Land Information System Project should be fully implemented.

This also raises the issue of training on the use of computerized information systems which are a newly introduced technology at BMA. Training and further technical assistance doubtlessly will be required.

TABLE 2. INFORMATION SYSTEMS PROJECTS

Ongoing Computer-Aided Information Projects for Urban Planning and Monitoring Purposes	A. Land Collection Project Executing agency: BMA, Department of Policy and Planning Data provision: Department of Lands Project duration: Starting date, 1979, ongoing Equipment: HP 3000, series 42 Project results: Increase in land tax collection of 7 million baht, during 1982-86
	B. Road Inventory System Executing agency: Department of Public Works Data bases comprise information on: - control links - bridges - pedestrian bridges - pavements - public utilities - intersections Equipment: NEC microcomputers Software: MS-DOS version 2.2/d-BASE II version 2.4
	C. Department of Sewerage and Drainage, BMA Pilot project where a specific area was digitized from a map at a scale of 1:20,000 in order to produce a line map showing all the roads, canals, railways, and border lines between districts.
Information Systems: Urban Planning and Monitoring (manual)	Urban Planning Data Bases and Data Management, City Planning Division, BMA Different kinds of urban planning data are collected on a routine basis, updated and analysed, according to planning priorities: The planning data bases are in the areas of: - mapping (379 maps covering the inner city area are available, a manual tax mapping project is ongoing) - taxation/cost recovery - population - land use planning - social, economic, cultural information - plan/planning implementation information

TABLE 2. (Continued)

Information Systems: Urban Planning and Monitoring (manual)	All data/information is collected manually. (i) The subdistrict is the smallest spatial unit for urban planning/monitoring. (ii) Control-data at this spatial level are collected on an annual basis. This also permits speedier and more efficien as well as effective tax collection. (iii) Despite the obvious limitations of the manual approach to data collection/analysis, the information collected lead to a better understanding of the development pattern at the subdistrict level.
Tax Mapping Project (manual)	Executing agency: City Planning Division, BMA Project duration: 1980-86 Project scope: (a) To prepare information files (graphic/non-graphic) on the location of taxable buildings and signboards for more efficient tax collection management (b) To provide access to up-to-date information on land and building uses which will be beneficial to zoning control management and planning Data collected: In addition data/information has been collected on: - Building types - Building height - Building uses - Land uses - Vacant land Manpower requirements: 150-200 temporary personnel and 30 permanent staff Total project cost: 15 million baht Project evaluation: (i) The urban planning information derived from this project has been analysed for planning purposes at the Cit Planning Division. Some useful findings, such as non-registered or illegal service industries, have been discovered in the project area. (ii) The tax maps of the BMA have equally been disseminated to other agencies as well as the general public for thei own use. (iii) However, with such manual approach, the updating/storing of information is one of the major problems of thi project.

Suroso Moersidi, "The Remote Sensing System and Digital Processing for Regional Planning and Urban Monitoring in Indonesia."

The Remote Sensing in Engineering Project, Indonesia (established in the Ministry of Public Works with Japanese technical cooperation, 1980) aims at building up a management information system for spatial planning and decision making purposes.

The management information system is of an integrated nature, consisting of information/data collection through remote sensing linked to a computer system for the storage and handling/processing as well as dissemination of data/information collected. Its prime objective is to assist and facilitate spatial and agricultural planning and decision making.

The project is co-financed by the Japanese and Indonesian governments. The Japanese government contribution amounts to approximately US$1,714,340, exclusive of provision of experts and training, and the Indonesian government contribution amounts to approximately US$176,082,000.

1. Project Description

   (a) Functions of the system: Data generation, data management, and planning support.

   (b) Main features of the system: Data collection/processing, data analysis, and production of maps for land evaluation purposes.

   (c) Data collection methods: Spatial data is collected periodically from LANDSAT/SPOT (ground stations are based in Indonesia, Australia, Thailand, and the United States) in the form of computer compatible tape. Airborne data is gathered for specific purposes or needs.

   (d) Data analysis: Through a computerized system systematic analysis of the data supplied is undertaken for general use.

   (e) Products generated: Graphic information, thematic map production, and land evaluation map production.

Suroso then made reference to the following issues to be considered when adopting (i.e., financing) and designing an integrated management information system for spatial planning purposes:

(a) It is difficult to quantify in economic and financial terms the value of information. No cost-benefit analysis has been undertaken for this particular project. Nevertheless the adoption and introduction of such systems bears clear cost/benefit aspects which should be kept in mind. The question of how to evaluate the value of information remains unanswered.

(b) Indonesia, in regard to training, adopted an expert-counterpart or "learning by doing" approach. This approach so far has been proven to be appropriate.

(c) In regard to data/information dissemination, it has to be noted that there is a need for line agencies and other departments to clearly identify and specify their requirements in order to allow successful and useful dissemination of the outputs generated by the project/system.

Suroso then proceeded to the presentation of the following two case studies (here the management information system was used for planning and monitoring purposes):

(i) Agricultural Land Evaluation, Java and Madura Islands -- The objective is to evaluate land capability by using physical data for agricultural infrastructure development planning.

(ii) Urban Monitoring, Jakarta -- The objective is to evaluate land use changes in the Jakarta urban area and surrounding areas through temporal satellite data for urban monitoring purposes.

Both case studies indicate that the successful use of a management information system is also dependent on the clear identification of the objective for which it is used.

2. Issues and Lessons Learned

(a) Factors which inhibited the full success of the project concern:

(i) Lack of administration and management coordination between agencies and departments concerned.

(ii) Lack of user interest, especially at the local government level where manual processing for data handling and presentation prevails.

(iii) Lack of data integration (here it has to be noted that the design of an integrated spatial data bank system invariably encounters problems of coding and standardization. Also, it is difficult to store socioeconomic data in a geographic reference code).

(b) Areas where improvements should be sought for concern:

(i) The organization and management of such project. Organization must be developed and stabilized in good management for proper storing as well as supply of data to other operational agencies and to ensure that the information supplied meets the needs of planners and decision makers.

(ii) The development of technology/technological know-how. Over the last decade rapid developments in both hard- and software took place. Therefore, one of the problems is how to anticipate these changes especially in regard to training needs for skilled manpower. Technical assistance in this area is still required for this project.

(iii) International cooperation. Remotely sensed data from satellite are used as baseline data in this project. There will be a need for international cooperation as launching new satellites will imply, especially for developing countries, that efforts should be made to ensure that the new satellite systems will be compatible with processing units already installed.

Nevertheless, spatial information systems based on computer equipment are very powerful tools for data storage and handling. Integrated management information systems, which are spatial in orientation, have proven to be useful tools for planners and decision makers in the area of urban/regional planning in Indonesia. There is a continuing need for further technical assistance in the areas of equipment, provision of experts, and training.

Discussions

It was generally noted that all three papers presented should be considered as keynote papers due to their practice orientation.

Both the Bangkok and Jakarta case studies were felt to be extremely useful contributions as at present a lack of documentation in the area of the developing countries' experience with the actual practice or use of digitized map data sets or remote sensing in the planning of urban areas has to be recorded.

Doubtlessly, it would be highly desirable to undertake further case studies of this type. Much could then be gained out of the comparative analysis of and perspective on the developing countries' experiences in the use of information technology. Lindsay, in relation to the latter, raised the issue of the role that institutions such as UNCRD and the United Nations Centre for Human Settlements (Habitat) could perform in facilitating the collection and dissemination of country experiences.

Further issues stressed concerned the following:

(a) The successful use of information technology is dependent on the immediate practical use to be derived out of the system adopted; this has been clearly demonstrated in the Bangkok case study.

(b) Important aspects to be considered in the use of information technology concern:

(i) the cost-effectiveness of the system to be used; i.e., what will be the rate of return (and in what time) on the initial capital investment. It was outlined that a favourable pay-back ratio on the initial investment does not only constitute a measure for the success of the system adopted but in addition frees additional financial resources for further investment (or at least the system becomes self-financing) and will equally enhance the further use and adoption of information technology.

(ii) manpower to be employed or required; i.e., in the case of the Bangkok Tax Mapping Project, about 100 personnel are involved in the project; this leads back to the question of: What is the value of information, and how should one quantify the value of information?

Kitamura summarized the lessons to be learned out of these case studies, especially the Indonesia case study:

(a) It is important that a project's scope/aim be clearly defined;

(b) Project formulation has to be undertaken in a straightforward way;

(c) The project itself should be of an integrated nature, and as shown in the case study of the Indonesia project, it is important to link the project to the production of an atlas/map to be used as basic and essential tools in regional planning and for regional planning purposes.

It was generally agreed that there is a need to undertake more country case studies; this in return will hopefully also lead to increased availability/documentation of developing countries' experiences in the use of information systems and technology.

Response by Speakers

(a) In accordance with the discussants' comments, it was again pointed out that a project will only be successful when the project is integrated in its nature.

(b) In most developing countries, information systems and technology are set up with the help of technical/foreign capital assistance. Therefore, it is important that there be a clear understanding between the host and the donor on the project's aims, costs involved (capital/recurrent cost), project components, project duration, etc.

(c) In regard to the issue of the value of information and how to quantify/evaluate the value of information it was suggested to consider: What happens with the use, what happens without the use of information systems and technology?

(d) A very important aspect for developing countries in regard to the adoption and use of information systems and technology is the cost(s) involved -- initial investment required as well as recurrent and user costs. Therefore the adoption/use of information systems bears a clear cost-benefit aspect to be taken into account.

(e) Furthermore, developing countries remain dependent on foreign technology; it will be important to develop and/or strengthen national capacities/capability in the development of indigenous information systems and technology with an ultimate goal of self-reliance in this area.

(f) It would be recommended that developing countries take an incremental approach to information systems and their use.

SESSION 3.3: INFORMATION SYSTEMS PROJECTS IN DEVELOPED COUNTRIES

Wednesday, 22 July 1987, 11:00-12:00; 13:30-14:30

Moderator: Christian P. Averous

Rapporteur: Monte Cassim

Speakers:

Hajimu Hori, "National Land Information and Its Application for Regional Planning."

Syoumei Yokouchi, "City in an Advanced Information Society."

Akira Takemura, "Support System for Urban Planning in Hyogo Prefecture."

Hiroshi Sugimoto, "Integrated Administrative Information System: Project Planning Support System."

Frank le Clercq, "Evaluating the State of Information Systems in Amsterdam."

Armando Montanari, "Environmental Research for the Economic Development of the Mediterranean Region."

Discussants: Ko Kheng Hwa
Arporn Chanchareonsook
Michael Phillips

Presentation of Papers

Hajimu Hori, "National Land Information and Its Application for Regional Planning."

Hori's presentation centred on the national land information system in Japan, established under the auspices of the National Land Agency, Government of Japan. He commenced by asking some fundamental questions: What is national land information? and Why is it necessary to collect it? He defined it as all information related to a nation's land (including cartographic, statistical, scientific, technical, systemic, and other forms of data) which are of importance to planning at the national, regional, and local levels.

Hori noted that the awareness of the importance of national land information to planning in Japan could be traced back to the Second National Comprehensive Development Plan of 1969. This need was further emphasized in the Third National Comprehensive Development Plan of 1977, where an extensive stocktaking of national resources was carried out. The planning emphasis of the Fourth National Comprehensive Development Plan, published just a few weeks ago, indicates that need for the use of national land information by local governments.

He went on to discuss the preconditions for gathering national land information and its meaningful utilization. When issues are identified, strategies formulated, and impacts (both positive and negative) are assessed, the methods and procedures for gathering and utilizing national land information begin to acquire a meaning. This requires that: (a) the situation in a particular region be assessed accurately; (b) the information enabling this assessment be organized in a common format; and (c) the output of such information be easily understood.

The accurate assessment of a region or district requires the processing of large volumes of data. The computer is a useful tool for this purpose and data formatting will need to take this into account. For discussion and debate upon matters pertaining to planning, a common basis for the understanding and interpretation of this information is required. The same information can be presented in a variety of ways, some of which may be more easy to understand than others. Using the example of population data, which can be presented as a set of statistical figures, or as mapped information, Hori noted that the latter was a value-added presentation technique which was more easily understood by the layman. Such techniques are of particular importance when we consider the increasing need for lay citizens to contribute their views and desires into the technical processes of planning.

Hori went on to indicate the factors that had enabled the collection and utilization of national land information to become a reality. These include: (a) the increasing awareness among local governments of the need for such information; (b) the increased accessibility to computer systems in recent years; and (c) developments in the formatting and expression of data bases which, however, still need further refinement.

Hori felt that the process of plan formulation and utilization will change as the national land information system diffuses into local governments. Increasing exchanges among regions and nations is likely to compound this further. A better understanding of the national land, knowing it accurately, and having a basis for making forecasts of the demands on the planning process are beginning to appear on the horizon. The exact image of these changes is not clear, although the possibilities remain immense.

Syoumei Yokouchi, "City in an Advanced Information Society."

Yokouchi's presentation centred on the concept of an "intelligent city" as representative of the information age. Observing how the information revolution has changed the city, both in terms of its positive and negative impacts, Yokouchi went on to describe two examples of the application of information systems for resolving urban problems, viz., (a) the doshakan joho system (providing information to drivers on the distances between vehicles on the road), and (b) the Satellite Office System (where the physical decentralization of head office functions helps in resolving commuting problems).

While urban concentration increased efficiency, it also caused congestion and related problems. A compact city, but one which offered gracious standards of living was an objective to be sought after. Such concerns were of particular relevance to giant metropolises like Tokyo, where concentration of population and activities was on the increase again since 1980. Interestingly, the reason behind this fresh wave of growth in Tokyo was the information revolution. Today Tokyo's receipt and dispatch of information stands well above other regions in Japan, including the other metropolitan regions as well. Such problems are all the more severe in the small- and medium-sized cities serving outlying regions. It was against this background that the TELETOPIA concept (johoka tushin toshi koso) was conceived.

The TELETOPIA concept envisages: (a) the laying of information networks among cities and within communities (e.g., in the development of new residential estates, the cables of CATV networks serving these communities could run under the distributor and feeder roads); (b) the establishment of information receipt/dispatch bases (high level information centres, such as the "intelligent buildings" which are booming now in Japan, may be considered as part of the new urban economic infrastructure, or the production bases for postindustrial societies); and (c) the application of information systems in cities (e.g., the Urban Information System (UIS) II, developed by the Ministry of Construction).

Yokouchi went on to elaborate on UIS II. Tracing its origins to UIS I, developed in the mid-1960s, UIS II aimed at organizing information with a view towards improving urban planning. It was comprised of three levels, or subsystems, viz., (a) city administrative information, covering the entire area of jurisdiction of the local government, (b) urban district information, covering neighbourhood or school districts, organized as map information to the scale of 1:2,500, and (c) detailed urban district information, also organized as map information to the scale of 1:500.

UIS II is a comprehensive information base, linking a wide range of data sets from different administrative activities. Since each city, town, and village tends to develop such data bases independently, Yokouchi underscored the need to establish standards, such as those laid out by the Ministry of Construction, for the establishment of data bases.

Akira Takemura, "Support System for Urban Planning in Hyogo Prefecture."

Hyogo Prefecture first introduced the Planning Information Analysis System (PIAS) in 1975. PIAS has a broad data base, founded on a bottom-up collection system, providing support to business decisions and to top management for policymaking and strategy formulation. In 1980, the Geographic Information Management System (GIMS) was introduced to further expand PIAS. Today PIAS is comprised of analytical models and software packages which interact with GIMS to provide planning and decision making support. However, the level of disaggregation of PIAS/GIMS is not fine enough for urban planning support. This led to the development of Support Systems for Urban Planning (SSUP).

Among the characteristics of SSUP, we may note that it is: (a) developed specifically for urban planning; (b) more detailed than PIAS/GIMS; (c) interacts with a giant data base, compiled in time series; and (d) an attempt to assist planners by stimulating "visual thinking" and organizing real-time information. SSUP consists of interactive information covering population, land, and buildings.

SSUP's input functions handle both map and numerical information. Its processing functions include map overlays, urban facilities distribution maps, compilation of ranking maps, geographical analyses, etc. The output media include display screen, hard copy, instant photographic slide, X-Y plotter, etc.

As a concrete example of SSUP capabilities and functions, Takemura outlined the Land Use Planning Review, a five-year rolling plan. Its basic underlying concept covers: (a) formulation of the planning logic underlying land use zoning; (b) measures for dealing with policy issues; and (c) measures for dealing with citizens' needs.

SSUP may be described as a problem-discovery prototype, showing the distribution of land and building uses. In Hyogo Prefecture's experience, it had contributed towards shortening the time required for problem identification at the microdistrict level from 30 to 3 man-months. It is hoped to extend the functions of this prototype to permit interaction among lay persons and professionals. This is of particular importance for citizens participation in planning. Thus, visual communication, stimulating "visual thinking" by both nonspecialists and professionals will play an increasingly important part in developments in the years ahead.

Hiroshi Sugimoto, "Integrated Administrative Information System: Project Planning Support System."

Commencing with a brief introduction to Kawasaki City, Sugimoto went on to trace the background to the development of the Integrated Administrative Information System (IAIS) concept. Originating as a cost and labour saving measure, between 1960 and 1975 the system principally dealt with the processing of a large volume of calculations. Since 1975, specific work items, including payroll management, were added. This marked the beginning of the awareness that such information processing systems would enable qualitative improvements to the administrative services offered by the city.

The system components of IAIS today are: (a) the Project Planning Support Data Base System, similar to the one in Hyogo Prefecture (see Takemura's paper); (b) the Project Progress Control System, similar to the one in Baltimore (Kawasaki's sister city), whereby the current situation can be speedily reported to the Mayor; and (c) the Citizens' Facility Data Base System, which monitors the nature of use and management of public facilities in the city.

The Project Planning Support (PPS) Data Base System is structured into twelve large data items, viz., (a) population, (b) estate and environment, (c) living environment, (d) health and medical care, (e) welfare, (f) income and consumption, (g) education, culture, and leisure, (h) employment and labour, (i) industry, (j) traffic and transportation, (k) security, and (l) administration. These large data items are disaggregated further into 50 medium-scale and 110 small-scale items.

The output items of the PPS Data Base System consists of: (a) principal indices (population, number of households, number of foreign residents, number of farmhouses, and number of establishments); (b) population change and change in the number of households; (c) daytime and nighttime population, and employment by industrial sector; (d) scale of land use; (e) housing conditions; (f) scale of green areas; (g) scale of parks; and (h) complaints about public nuisances.

Spatially, the data units cover: (a) the entire city (shi); (b) the wards (ku); (c) the neighbourhoods (cho, chome); (d) junior high school zone; (e) primary school zone; and (f) 500 meter mesh.

In conclusion, Sugimoto noted that among the factors which helped in the transition from more large-scale data processing to a planning support information system, developments in computer technology over the past twenty years had played a major part. Increasingly user-friendly systems and microprocessor developments have made computer technology more accessible and inexpensive. However, Kawasaki City's twenty-five years of experience in the field indicated that continued investment in the training of personnel and upgrading their skills, remained as the central challenge in developing and improving information systems to support the planning process.

Frank le Clercq, "Evaluating the State of Information Systems in Amsterdam." (Summary by James F. Goater)

The speaker began by explaining that Amsterdam has several sectoral information systems supporting city planning -- there is no single integrated system. Three systems had been selected for purposes of presentation at the seminar: The population forecasting system; transportation system; and a system for registering the use of buildings and land in Amsterdam.

The population forecasting system was mainly a citywide forecasting tool, meant to supply targets for sectoral planning, which emphasized how important consistency of information was, in planning information.

The transportation information system was comprised of the integration of personnel organization, data-gathering, modelling techniques, and applications. It had a history dating back to the traffic boom period of the early 1960s.

The building-use information system was a recent adoption having relevant data applications. The type of information was strongly related to geographical reference systems -- geocoding. Urban renewal was served to good purpose by this information system. He referred those interested, to his paper which contained more detailed descriptions.

Having briefly introduced the three systems under study, le Clercq explained that his presentation would be divided into three sections: Conclusions -- what could be learned about information systems? The structure of information systems -- lessons about management of information systems, and the organization thereof; and, thirdly, perspectives, i.e., to expand or fine-tune existing systems to the planning process.

The three systems had begun as simple data collection systems more than twenty years earlier but, in the interim, had been expanded into planning and decision support systems. He went on to describe the continuous process of data collection, information processing, and application, resulting in increased understanding of how the transport system worked and further data needs.

The speaker then described that actual applications of each system's information output, e.g., the population information system directly supplied information to the school system to enable adequate planning for enrollment; the recreation department was also interested in this type of data. This information was a vital input as a planning support. The transportation IS provide information to government to support decisions on road building.

Three levels, viz., observations, integrative knowledge/synthesized knowledge, and applications (at the project levels) were distinguished; an evaluation of the development of these three levels formed the second part of the paper. He first noted the importance of knowing what to choose, i.e., information selection analysis. This was very much situation-based. Sophisticated systems required more highly skilled personnel; experience in Amsterdam indicated that planners were not so interested in this type of system, relying more on their own experience as soon as the data techniques became too complicated. He observed that there was more need of continuous data, not just that needed for specific projects -- information needs must be balanced, however. There was the constant danger of information overload, i.e., an oversupply of information, not all relevant, though he did realize the complexities involved in very specialized data supply. From a management perspective the balance necessary must always be borne in mind. The constant evolution in planning techniques ensured that there was an ever-changing data requirement -- management should be aware of the more or less autonomous sources of change.

He then listed strategic issues, which would need attention, if the systems in Amsterdam were to be improved: (a) geocoding system necessary; (b) emphasis in systems development should be top-down -- starting with the applications, with an information requirement analysis and ending with data to be observed and collected. Beginning in this way would avoid information overload.

The third point concerned the perspectives of IS: (a) planning needs processed knowledge, i.e., planning knowledge; (b) how can information requirement analysis be carried out? Planning knowledge needed to be built up to be incorporated into models so that more effective solutions to specific problems could be tested. The presentation concluded by noting that additional notes concerning information requirement analysis were to be added to the paper during its final draft writing.

Armando Montanari, "Environmental Research for the Economic Development of the Mediterranean Region." (Summary by James F. Goater)

Montanari began his presentation by noting that the region which fell within the purview of his paper also included countries which could not really be called "developed." He noted also that the work in which he was involved was to facilitate economic development at every level. Currently there was a very heterogeneous level of development -- the European Community (EC) had expanded to include Greece, Portugal, and Spain, and was extending associations with Turkey.

In the area of population development, which he felt had particular importance, it was observed that the earth's population had recently passed the five billion mark, although little attention had been paid to the fact that this population growth affected different regions in different ways. In the Mediterranean region growth in the northern countries was declining while in the southern countries -- Algeria, Egypt, Turkey -- it was increasing. This meant that by the year 2000, many millions of young unemployed would be looking northward for something to do. Countries such as Italy would have stable populations at that time, therefore these projections had serious implications. Thus regional development is confronted with a serious challenge of vital importance (to Italy and the EC as a whole). In order to set up an effective regional research network, cooperation must exist. In the case of the Mediterranean region this does not exist, as the European countries have traditionally associated with the Nordic European nations, North America, and even Japan. Little concern has been shown for cooperation with the countries of the southern Mediterranean.

One noteworthy area of cooperation, however, is that established by the United Nations Environment Programme (UNEP) focused on an area of common concern -- environmental pollution. It seemed that only in specific areas of common concern could cooperation take place. In the kind of network which the speaker's institution (the Research Institute for Mediterranean Economics) was trying to set up was facing a number of problems. For example, the lack of information -- planning for economic development could not take place in the absence of information. There was a great shortage of data at the minimum geographical unit -- the community level -- which was the level upon which the research project was basing its collection activities. Maps, teleimages, and statistical data -- all relatively expensive -- were utilized in this endeavour. The main innovation existed in the usage of existing thematic data (geographic, economic, social, etc.) to arrive at a clarification of satellite data. The purpose of this was to identify changes and thereby determine current tendencies.

As a conclusion, the speaker showed that statistically there were other regions in the world with similar characteristics, which could learn from the ongoing work (the Caribbean area and the Eastern Pacific region). It was therefore plausible to extend cooperation to the international regional level. Montanari saw this as a main challenge for the future.

Discussions (Summary by James F. Goater)

Discussion began with comments from Ko, who observed a common thread running through each presentation, i.e., the need for building computer-based information systems and data bases to support planning functions. Montanari had outlined experience at the international level, through his presentation on the Mediterranean region. Hori had earlier given an exposition of the use of such systems at the national level. Takemura had elaborated on the application at the prefectural level, while Sugimoto had explained the city-level adaptation, with reference to Kawasaki City. Yokouchi had sketched out ideas as to how these systems could be applied in the "city of tomorrow," with his Intelligent City concept. Le Clercq had provided theory and practice of implementing these systems based upon the Amsterdam experience -- the issues and strategic choice availability. Ko underlined the conviction, shared by all, that such systems are indeed beneficial and of great time saving value, but then noted that a greater challenge is the actual implementation of such systems. His principal submission was that the greatest challenge of all lay with non-technological issues; he listed four aspects: (a) difficulties with interagency, interlevel, interorganizational coordination making effective cooperation and collective efforts immensely complex; (b) need for the interconnexion of all these systems at various agencies, the prerequisite for which was standardization. There could be no meaningful data exchange without a common understanding of meaning and structure -- by both programmer and user. Building textual data and mapping data were areas in clear need of suitable standardization; (c) cost-benefit analysis engendered difficulties in justifying investment priorities as it was very difficult to place a dollar value on information. How could governments be convinced that investments in IS could lead to better planning? The private sector was also involved as better business decisions could result from improved information. The discussant finally listed his fourth aspect (d), which he labelled "grand design vs. incremental development." By this was inferred the decision to start entirely new design for IS, or whether to rely on existing systems and gradually expand and integrate from the common data base.

Ko rounded out his comments by voicing his opinion that, with reference to Yokouchi's presentation on the advanced information society, apart from the technological challenge what should also be examined are the social aspects, the human dimensions of such a concept. What would be the effect on humans of reduced human contact inasmuch as computer screens, telecommunications, and digital information would become commonplace, rather than direct human interaction? These considerations would surely need to complement the technological issues.

The second discussant, Arporn, reiterated the importance of studying the social aspects of IS, in agreement with Ko, noting that the impacts of IS, particularly the environmental impacts should be closely examined. She expressed caution regarding the establishment of centralized data bases and their inherent insecurity -- thoughts should be directed at what kind of data bases should be established. She was impressed by Montanari's description of the setting up of an integrated international information network by the Research Institute for Mediterranean Economics and its progressive nature. Her final comment concerned the le Clercq paper and information requirement analysis. Necessarily, cost constraints limited the amount of information flow, therefore it was of particular importance to determine what information was really necessary.

Phillips restricted his comments to the raising of some issues regarding land information systems, which was his area of expertise. In the Australian context, the IS infrastructure which was fairly well developed, was approaching some complex problems. It was, therefore, the discussant's intention to share these issues with the assembled participants -- particularly in relation to operational land information systems. Noting the multidimensional nature of the problem, the discussant outlined the following: The video-games approach to mapping was all too easy to see, in the context of video graphic displays which even amateurs could use. Data accuracy, digitalization techniques raised questions concerning data integrity; what skills were necessary to bring together data from many sources and then perform a meaningful interpretation; what archival policies could be adopted for non-current land data; what measures could be taken to improve data consistency/standardization; how could the confidentiality of data be safeguarded; professional jealousies were engendered in discussions as to who actually should control specific types of data -- here the area of land information was a particularly thorny problem in Australia; in the area of pricing policies it had previously been affirmed that governments ought not to be in the business of money-making. However, in Australia and New Zealand this was not the prevailing attitude -- how could one price a land information system if a private company were to take over its operations?

Phillips concluded by asking the speakers whether they could foresee the development of expert systems, given the known constraints, in the area of land information systems. He expressed his doubts.

Michael Batty, from the floor, opined that social and political issues were likely to determine the future of IS, not pure technological ones. He voiced agreement with Ko and Phillips and, with examples, showed that the sociopolitical climate would be a considerable constraint to technological development of the "information city" of the future. Witiuk added a point of information, via the standardization issue, noting that progress is being made on a number of fronts, between countries, regions, etc. Toshiro Edamura commented on Phillips' concluding question and explained that a project he was working on concerning a road building scheme was utilizing a limited expert system. This had so far been unannounced as it was still undergoing testing.

Taichi Ohshima, followed on from Witiuk on the question of standardization. Associated with the International Standards Organization (ISO), he gave assurances that measures for standardization are proceeding. He then requested that Hori, the first speaker in the session should elaborate on one of the points in his paper -- "the dynamic expression." He also felt that four dimensional constraints were possible in future land information systems.

Responses having been elicited from the speakers, the discussions continued thus: Hori, regarding the request for elaboration of the "dynamic expression" noted that such dynamism resulted from combining various techniques of data display. There are many theoretical possibilities, but so far no concrete results have been achieved by his organization. He then noted the extreme complexity of standardization, noting how important it was to define exactly what the objectives were in any single standardization exercise. What was useful for one agency could not necessarily, for example, be standardized so as to be useful for a different agency.

Averous then closed the session by remarking that the scope of the meeting should be enlarged from pure technological issues to embrace the sociopolitical spheres.

SESSION 3.4: RESEARCH IN INFORMATION SYSTEMS

Wednesday, 22 July 1987, 14:50-17:00

Moderator: Gerard Linden

Rapporteur: Armando Montanari

Speakers:

Yoshinobu Kumata, "Interactive Design Process for Campus City Kawasaki: An Approach to Cooperative Change Towards an Advanced Information City."

Hideki Kaji, "Information Processing System for Disaster Management."

Teitaro Kitamura, "Methodological Considerations on Information Processing Systems for Regional Planning."

Toshiro Edamura, "Integrated Urban Planning Support Systems," by T. Edamura and Tohru Fukushima.

Hideo Nakamura, "Remote Sensing and Cadastral Data for Geographic Information System," by H. Nakamura, Eihan Shimizu, and Yasushi Shimoyama.

Discussants: Marvin L. Manheim
Michael Batty
Bambang Sungkono

Presentation of Papers

Yoshinobu Kumata, "Interactive Design Process for Campus City Kawasaki: An Approach to Cooperative Change Towards an Advanced Information City."

The Japanese population is aging quickly and more women are entering the labour market. The international role of Japan is gaining importance and its internationalization process is growing fast. Against this background, the planning process has to be changed accordingly. In early 1986 an International Concept Design Competition was launched under the title, "An Advanced Information System in Campus City Kawasaki." The competition has been concluded and the results published in July 1987. New social classes are actually emerging in our society and this has to be taken into consideration by the planners. The idea for Kawasaki is not to build a new campus but to transform the city itself into a campus.

Hideki Kaji, "Information Processing System for Disaster Management."

Disaster management is one of the biggest issues in the field of urban and regional planning in Japan. Four stages of actions can be identified: Pre-disaster, warning, response, and recovery and reconstruction. For each stage, the information required is as follows: Phase I, Pre-disaster (data base; casualty and damage predictions, training programmes for citizen awareness and preparedness, early signs of impending earthquake); Phase II, Warning (broadcast alert, directives, tidal wave and earthquake information); Phase III, Emergency countermeasures (damage and casualty information, fire-outbreak spots, conflagration status reports, evacuation route status reports, population figures by zone, available hardware, materials, personnel, demand, rescue, and first-aid efforts); and Phase IV, Recovery and reconstruction (total damage, who is doing what and where, progress of rescue and first-aid efforts, recovery and reconstruction plans).

Teitaro Kitamura, "Methodological Considerations on Information Processing Systems for Regional Planning."

An information processing system for regional planning needs a clear objective in order to reduce data collection. In fact, there is a risk that 80 per cent of planning work may be used for massive collection of data, 20 per cent for preparing the plan, and only 10 per cent for actual planning. The hardware and the software to be used have to be chosen according to the analysis and the planning documents.

Toshiro Edamura, "Integrated Urban Planning Support Systems," by T. Edamura and Tohru Fukushima.

Integrated urban planning support systems are under development to aid in the construction of the Urban System Dynamics (SD) Model Support System, the Zoning Support System, and the Residential Site Selection System. The models have been tested and developed using a network of 274 data bases in 180 Japanese cities with a population of more than 100,000 inhabitants.

Hideo Nakamura, "Remote Sensing and Cadastral Data for Geographic Information System," by H. Nakamura, Eihan Shimizu, and Yasushi Shimoyama.

A geographic information system should manage large volumes and various types of data from the most macro remote sensing to microgeographic and cadastral data. An audiovisual elaboration of a geographic information system could be a great advantage in facilitating citizen participation in urban and regional planning.

Discussions (Summary by J. S. Edralin)

Manheim (commenting on the Nakamura, Kitamura, and Kaji papers) sketched an evolutionary model of the development of information technology. The first stage, the technocratic or technical stage, focuses on questions such as what hardware to use, and what standard software packages, data bases, and large-scale models to develop. Further questions are: What really is the relevance of these technical tools? What kinds of tools are really relevant? The second stage, the human stage, focuses on understanding the potential user of the computerized tools -- his/her organizational environment and the internal and external decision making process. The questions to be addressed are: How can user participation be actually implemented? What is the actual set of decision issues that must be analysed? What is the minimal data and tools necessary to support the process? Further questions for consideration are: What are the psychological dynamics that should take place in decision making? What is the psychology of decision making? What software packages can be used to support the psychological dynamics of decision making? Having discussed these issues, Manheim asked the final question: Should we now focus attention on understanding the user and the organizational psychology of decision making so that we can use technology more effectively and develop tools that are really appropriate to the user's environment?

Batty put a slightly different perspective on the same set of papers by emphasizing the differences between the applications of information systems along a continuum, from routine activities through to strategic activities. The information systems developed by banks and airlines, or for disaster management, for example, are in a sense routine information systems operating in real-time. The routine information systems seem more appropriate than the strategic information systems, as they are much more concerned with well-defined problems; but nevertheless, as illustrated by Kaji and Manheim, there are major problems in using routine information systems related to human response. In contrast, the strategic information systems (e.g., the models developed by Edamura and Kitamura), which are concerned with long-term strategic planning, seem to be much more controversial in terms of their use than the more routinized ones. Clearly social and political questions are involved when considering the use of information systems.

The major questions which relate to the development of the information city are: Who is actually going to build it? and more particularly, who actually pays for it?

Following on from Manheim's point, Batty raised a final question -- How do we actually use information technology? More work is needed to examine cases of the misuse, abuse, and nonuse of information technology.

Bambang (commenting on Kaji's paper) noted the differences between Japan and Indonesia, with respect to the frequency and type of disaster; the ability to cope with the problem in terms of personnel, budget, and method; and the level of awareness of the people and the government. He focused on the following issues: In the response phase, what agency is most responsible for supplying information? In the reconstruction phase, to what extent do people affected by disasters participate in decisions concerning their homes and property.

Two other participants offered their comments on: (a) the low level of concern about communicating planning decisions with the victims or recipients of planning (Droege); and (b) the need for an information distribution network to facilitate access to data at various levels (Matsuzaki).

From these presentations and discussions, the moderator summarized the general issues:

(1) Attention to social, political, and organizational issues in implementing information systems;

(2) Active participation of users in developing information systems;

(3) Research aimed at reducing information overload.

SESSION 3.5: TRAINING IN INFORMATION SYSTEMS

Thursday, 23 July 1987, 9:30-10:50

Moderator: Richard E. Klosterman

Rapporteur: Roswitha Newels

Speakers:

Itoko Suzuki, "Training for Information Resources Management in Public Administration," by J. H. Oyugi and I. Suzuki.

Michael Batty, "Educating Planners in Information Technology: Experiences from Developed and Developing Countries."

Gerard Linden, "The Development of Curricula in the Field of Geo Information Systems: The ITC (International Institute for Aerospace Survey and Earth Sciences, Netherlands) Experience."

John B. Rose, "Problems of Training and Research in the Application of Information Systems to Subnational Development Planning," by Ralph Adam and J. B. Rose.

Discussants: Sukehiro Gotoh
Suroso Moersidi
Yu Hong

Presentation of Papers

Itoko Suzuki, "Training for Information Resources Management in Public Administration," by J. H. Oyugi and I. Suzuki.

Suzuki highlighted the substantive aspects of UN/DTCD's training approach, efforts, and undertakings in the area of training for information resources management in public administration.

1. Rationale Behind DTCD's Approach to Training and Identification of the Target Group for Training

    (a) It has to be recognized that government information systems and their use are crucial as well as strategic tools to improve the capability and capacity of government administration.

    (b) Ultimately, the benefits to be derived out of the use of information systems will depend on the approach public managers and decision makers will actually take to the use of information systems. Therefore, there is a need to create management awareness and knowledge on issues related to the planning and development of information systems.

    (c) The above implies that the target group for training should be the senior public administration officers, as ultimately the successful use of information systems will depend on: The management's own knowledge on information systems; and the commitment of managers to the use of information systems.

Therefore, understanding and knowledge has to be created in the areas of: The possibilities and limits of computer applications in public administration; the steps necessary for their involvement in information systems development for effective decision making; procedures commonly used in the procurement of equipment and software; organizational impact of information systems development and management; and laws and regulations senior public managers need to be aware of.

(d) Training for senior management levels is also required in order to enable management to actually control the management of information systems and ensure their proper use in government operations.

2. DTCD's Executive Training Programme and Training Package

The design of this training programme has been derived out of DTCD's experience gained during the Special Appreciation Programme for Senior Government Officials, Stockholm, Sweden, October 1985.

(a) Target group for training: Senior public administrators and policymakers

(b) Curriculum: This is based on five themes: (i) Basic computer literacy; (ii) Application of information technologies; (iii) Management control of information systems; (iv) Laws and regulations; and (v) Procurement and contracting.

(c) Duration of training: A modular format is used to organize the course, so as to accommodate flexibly the busy schedule of government officials.

(d) The basic messages the course intends to convey are: (i) human resources planning has to go hand in hand with and prior to the adoption and use of information systems; and (ii) the managers must be able to control, or must be in control of government information systems in order to ensure the proper use of information systems in government operations.

Michael Batty, "Educating Planners in Information Technology: Experiences from Developed and Developing Countries."

Batty, in his presentation, focused on part II of his paper dealing with information technology in planning practice and issues related to education and training in this area.

Issues having direct implications for education and training of planners in applied information technology were highlighted:

(1) Information technology itself is undergoing rapid and constant changes; at the same time issues related to the use of information technology change. In the light of such changes, two questions need to be raised: (a) What will be the implications of these changes in technology for the education and training of planners?; (b) To what extent does education and training have to be country-specific?

Equally, one needs to bear in mind not only these changes and their obvious implications for education and training, but one also has to notice changes in regard to the notion of information itself where such features as the cost, security, and accessibility of information are gaining increasing importance.

(2) Technology changes impact as well on the practice of urban and regional planning itself. At this stage, the practice of urban and regional planning appears to limit itself to the routine rather than the strategic use of information technology.

Therefore, the overall impression one gets is one of ad hoc development in: (a) the area of information technology; and (b) the use of information technology for planning purposes, thus raising a number of questions and issues in regard to the design and delivery of education and training in this area.

Batty presented a case study of computing at Cardiff and the development of a campus information network in the University of Wales Institute of Science and Technology (UWIST) in order to demonstrate how changes and developments in hard- and software impacted on the use of information technology and how these changes impacted on the education and training required and relevant to different categories and roles of planners.

The case study showed that the current shock of new technology and the volatility in ideas and practice it has and continues to bring, makes a detailed and definite scheme for education and training out of the question.

The speaker then proceeded to the presentation of various microcomputer packages developed in-house in UWIST and a course entitled, "Microcomputer Packages" offered to beginning graduate students. This course introduces students to the range of planning techniques such as analysis, forecasting, and modelling using standard, general purpose, graphics-oriented software.

In regard to microcomputer packages (urban planning/modelling) developed in-house, these have also been usefully ported to developing countries. Batty quoted here the cooperation with the Institute of Technology MARA Transport Centre, Kuala Lumpur.

The overall experiences from education and training tend to indicate that:

(a) the variety, diversity, and complexity of the environment in which information technology is now an integral part, dominate any proposals for education and training at present.

(b) proposals for training must be distinguished between those designed to provide more robust and long-lasting skills in information technology, and those related to specific software/hardware which will inevitably become obsolete.

(c) the above issues are independent of who is being trained and at what stage, for in this period of constant and rapid changes in information technology, many groups involved in planning practice and education will need to be trained in some tasks and skills.

(d) there is much training to be done for the technical professional role. Raising awareness in end-users and inculcating deeper skills in analysts are easier tasks to define. But in the middle ground where professional planners are involved in day-to-day and strategic problem-solving and design, there are many training issues to be dealt with pertaining to how planners interact with the whole continuum of software types and creatively synthesize the various types with respect to their technical expertise. This is an area where urgent research is required, but it exists within the wider organizational context in planning which also has to be explored with respect to information technology.

(e) planners need to be trained in the organizational skills required to use the technology in the best way.

Gerard Linden, "The Development of Curricula in the Field of Geo Information Systems: The ITC (International Institute for Aerospace Survey and Earth Sciences, Netherlands) Experience."

Linden introduced his presentation with the mention that the substantive issues should generally be considered when designing and initiating training for information systems:

(a) Training should be a joint responsibility of government and business;

(b) There seems to be a gap between the possibilities in the use of information systems and the current practice or actual use and accessibility to the use of information systems.

Linden then proceeded to a brief overview on ITC's mandate, organizational structure, and current training activities.

1. Present Approach Taken by ITC to Training in Geographic Information Systems (GIS)

Training at ITC in GIS emphasizes on mid-career training which is reflected in the average age of 32 years of participants. Training courses delivered are intensive and their duration is twelve months. The curriculum construction for training in GIS is intrinsically linked to the characteristics and features of GIS as well as the functions GIS is capable to perform. Present courses delivered focus primarily on the provision of training in the use of GIS for urban, rural, and cadastral applications.

The courses address the management level. The courses aim at enabling participants: (a) to implement GIS in specific situations; and (b) to deal with vendors of systems.

2. Long-Term Perspectives on Training at ITC in GIS, or Geomatics as Guiding Principle for Future Curriculum Development

(a) Future training and curriculum development will be based on the concept of geomatics; the concept itself is a tribute to the value of spatially referenced data for the development of a nation. The concept of geomatics will directly influence curriculum design. The main challenges will be:

(i) to master the concept of integrated systems in all its facets; and

(ii) to respond to the recognition that geo information is an economic resource and that its optimal exploitation will depend on the effectiveness of the geomatics infrastructure for access, sharing, and value of this resource in the development of a country.

(b) The curricula should convey the message that geo information is a resource, that it assists in decision making, and that it is an essential tool for development.

3. Example of a Recently Developed Course on Integrated Digital Maps and Information Production: The Special Course for the Survey of India (SOI)

Linden illustrated through a case study the approach taken by ITC in regard to curricula development.

At the request of the Survey of India, ITC designed and conducted a three-month special course for officers of the SOI who will be responsible for the implementation of the Modern Cartographic Centre.

(a) The target groups of the course are: Managers, production managers, engineering support and development staff, and production unit supervisors in photogrammetry.

(b) The guiding principles of the course are as follows: Participants are responsible for the installation and operation of an integrated map production facility some months after completion of the course. Between the special course and their return to India the vendors will provide training on the equipment. The curriculum design has to take this into account. Therefore, participants are given insight into the management, use, and operation of an integrated map and information production facility, and in particular:

(i) the linking of data sources to user defined products through the use of integrated digital techniques;

(ii) assessment of the requirements of a digital topographical data base. The emphasis is on exposing the participants to the complexity of information classification, data structure, and quality of data.

(iii) facility management comprising hard- and software maintenance, documentation and administration, system security, and tape management.

Insight into these three aspects should enable participants to assess the strengths and weaknesses of the systems.

(c) Course structure and timing: The available twelve weeks are divided into different subject areas in a logical, effective, and practical way. Topics covered include five blocks of different lengths:

(i) Management issues on integrated digital map production (one week)

(ii) Photogrammetry, cartography, and remote sensing technology update (four weeks)

(iii) Case studies of integrated production lines (four weeks)

(iv) Data base design and management issues (two weeks)

(v) Testing of integrated digital map production system (one week)

The feedback on this course will be used to improve the curriculum and to design a twelve-month M.Sc. level course on the same topic.

John B. Rose, "Problems of Training and Research in the Application of Information Systems to Subnational Development Planning," by Ralph Adam and J. B. Rose.

Rose focused on the role of modern information systems in ensuring the success of multilevel development planning and the efforts and activities undertaken by UNESCO through its General Information Programme (PGI) in regard to the above.

1. UNESCO Activities and Projects in the Area of Information for Development Planning

UNESCO has been very active in the area of information for development planning through: The General Information Programme (PGI); and the Regional Network for the Exchange of Information and Experience in Science and Technology in Asia and the Pacific (ASTINFO).

(a) Activities and projects:

(i) ASTINFO

The objectives are: Access to information; exchange of information and experience; better and more complete information services; and more use of available information.

The approach and activities are: General framework for cooperation; consultative mechanism; national ASTINFO coordinating units and associated centres; methodologies, standard procedures; pilot projects; financing; specialized subnetworks; development of data bases; and training (information specialists and users).

(ii) Regional Seminar on Information Systems for Subnational Development Planning, Visakhapatnam, India, December 1985, sponsored by the Government of India, the International Development Research Centre, and UNESCO.

During the seminar three working groups were formed in order to cover each of the main levels of subnational planning: Local, urban, and regional (provincial).

The seminar's recommendations are as follows:

National level: National policy for implementation of information systems for subnational planning; and central focal organization to set goals and priorities, develop system planning methodologies for compatible and interconnected systems, bank of available software and sharing of information, data, and software, training of users and information specialists, and policies on data privacy and protection.

Regional cooperation programme: National contact point in each country and establishment of a regional secretariat, technical support from international organizations (particularly United Nations system), pilot projects and sharing of experience, regional training activities, and regional software evaluation and information centre.

(iii) UNESCO/ESCAP Pilot Project on Data Services for Local-Level Planning and Administration, Kalutara District, Sri Lanka, executed by UNESCO, ESCAP, and Data for Development International Association.

The Kalutara District information system has been geared to long-term rural development objectives. The initiative for undertaking a pilot project for the establishment of a data system for village-level planning and rural development in one specific district evolved from efforts to promote improved coordination and management of government information. A preliminary inventory at the District Office has suggested that a wealth of data in virtually every important sector existed in a form suitable for village analysis, relating for example to population, housing, agriculture, and industry.

(b) Training of Information Specialists and Users

With a view to providing a general training tool in the area of multilevel planning and use of information systems, UNESCO's PGI has collaborated with the Data for Development International Association in the preparation of an extensive training kit.

The training kit on socioeconomic and administrative information systems consists of eight modules:

Module 1.	Government Information Systems (examples)
Module 2.	Information and Information Transfer (general considerations)
Module 3.	Information Systems
Module 4.	Tendencies in Information Systems Design
Module 5.	Information Needs for Subnational Planning
Module 6.	Maps and Graphics
Module 7.	Geocoding
Module 8.	Strategies for System Management and for Access to and Dissemination of Information

The users and target group include senior decision makers, information collectors and users, and information systems administrators.

2. UNESCO/PGI Testing and Evaluation of Software for Planning Purposes

Within the framework of PGI activities and projects the following softwares for planning purposes were evaluated:

(a) Map Analysis Package (MAP): Grid-cell based; spatial analysis in land use planning and physical planning.

(b) Urban Data Management System (UDMS): Polygon based; spatial analysis and thematic mapping -- regional correlations, location-allocation, gravity model, and shortest path through network.

(c) Spatial Analysis and Automatic Data Processing Information Systems (SALADIN): Polygon based; automatic geodata management, thematic mapping, and spatial analysis in urban planning.

(d) AutoCAD (Computer-aided design and drafting package): Thematic mapping.

(e) Geo-Encoded Resources Integrated Data System (GRIDS): Grid-cell based; thematic analysis and mapping in regional planning.

Generally, it could be observed that due to the complexity of multi-level development planning and the diversity of its functions, in the design of software there is a need to take these diverse functions of planning into account and to develop from there the appropriate software.

The technology choice made will affect the application to be derived from the use of the system.

Another important overall issue to be considered relates to the financial implications for developing countries when foreign material is needed or acquired.

Discussions

Gotoh raised the following issues:

(a) Out of the presentation of these four papers, it becomes clear that we are only at the very early stages of experiences in regard to the design and implementation of training in or for information systems. This is due to a number of reasons as outlined by Batty. One of the main reasons is rapid, constant change in the development of hard- and software; this in itself leads to a number of problems in the conception of training.

Therefore, our experiences with training remain vague, and there seems to be a lack of a clear philosophy in regard to training.

(b) Questions to be addressed in the area of training are: Whom to train, i.e., clearly identify the target group; and what to teach/train. These issues are clearly addressed in Suzuki's presentation/paper. In regard to whom to train, it appears that we can identify two target groups: Decision makers, i.e., those deciding on the use of and resources for information systems; and people/users, e.g., those having access to information systems.

This implies that the underlying philosophies for the training of these two groups have to be distinct. In regard to the training of people/users, e.g., a trainer's training approach is suggested, in order to reach the highest spread-effect possible. In relation to this, the possible use of computer-aided instruction as a technique in the development of curricula should be explored.

(c) A further issue of importance is the actual use of information systems. Batty outlined that use has to be recorded mainly in the area of monitoring rather than strategic use. This matches with the Japanese experience where 80 per cent of the use lies in the area of word processing. This has obvious implications for training.

Suroso raised the following issues:

(a) The design of and training in information systems in the developing countries' context need to take into account the very nature of the development process and therefore development planning process itself, based on a twofold sectoral and regional (spatial) approach. Therefore, the problem areas will be:

(i) What is/are the ability(ies) of the current hard- and software for addressing the needs of these two planning levels?

(ii) How can we standardize information systems for use at the sectoral and spatial levels of planning?

(iii) How can we standardize data collection? In developing countries data collection and coordination and sharing of data at the various levels of a planning system are fundamental problems.

(b) Training in information systems and the design of training in or for developing countries present a feature which might not be of the same importance in developed countries, i.e., the variety/heterogeneity in educational levels/backgrounds. This doubtlessly is a main issue for the design of training in or for developing countries. This aspect will most likely make it also more difficult to identify target groups for training.

(c) In regard to the use of information systems for planning at the subnational/local level, we should bear in mind the problem of maintenance/provision of spare parts, which most developing countries face when they are provided with foreign equipment. Problems in the area of maintenance frequently lead to the abandonment of use of information systems.

Yu made the following observations:

(a) There can only be full agreement with the issues raised by Suzuki in regard to following:

(i) The inadequacy and lack of training ultimately would lead to a slowdown in the use of information systems, therefore the issue of training is of utmost importance.

(ii) One of the main target groups for training has to be the decision makers: Senior managers, senior government officials, and policymakers.

The main rationale behind this is simple: It is the decision makers who will ultimately decide on the use of information systems as well as on the availability of resources for the installation of information systems. It is this group who will have control over resources.

(b) It would seem that the above issues are actually issues of a universal nature rather than issues affecting exclusively developing countries.

SESSION 4: DEVELOPING AND IMPLEMENTING EFFECTIVE INFORMATION SYSTEMS STRATEGIES

Thursday, 23 July 1987, 11:10-11:40; 13:00-14:30

Moderator: Frank le Clercq

Rapporteur: J. S. Edralin

Guest Speaker:

Hiroshi Inose, "Challenges for an Information-Oriented Society: A Japanese View."

Speakers:

Ko Kheng Hwa, "Effective Information Systems Strategies for the Government Service: The Singapore Experience."

Christian P. Averous, "Development Strategies Concerning Information Systems in Urban and Regional Planning."

John Lindsay, "Designing and Implementing Information Systems Strategies."

Moriaki Tsuchiya, "Strategic Use of Information Systems Among Japanese Private Corporations."

Discussants: Johari bin Mat
Hidemitsu Kawakami
Faisal Al-Tamimi

Guest Speaker

Hiroshi Inose, "Challenges for an Information-Oriented Society: A Japanese View."

Inose put a Japanese perspective on the question of the impact of the new information technology upon society as a whole. He contended that the new information technology is emerging from the convergence of existing service modes (electronic and nonelectronic services) to form an integrated digital world. The impact is likely to have a profound effect on information services and on the economy and society at large.

Benefits to the economy and society of such convergence include the following:

(a) Users will be provided with diverse information and information services by means of common lines and terminal equipment. Information providers will be provided with diverse information using various types of processing, thereby ensuring multifaceted use of information and economy of scale. Common carriers of information will be provided with multiple and effective use of networks, thereby permitting them to invest in optical cables and other advanced equipment.

In order to fully utilize the benefits of the convergence of service modes, the legal system must be reorganized or restructured. It is also necessary to ensure harmony between competition and cooperation through multifaceted cooperation among and between public agencies and private enterprises.

(b) Standardization of information services will be advanced. The use of new information networks and the internationalization of information services will require standard hardware and software specifications, uniform standards between various services, and international conformity with regulatory measures to ensure free flow of information. The development of public and private sector data bases and other information resources in international languages will contribute to balanced outflow and inflow of information across national boundaries.

(c) The integration of socioeconomic activities will be enhanced and communities of interests will be strengthened. The new information network will make it possible to integrate such activities transcending geographic distances, as well as to unify information services. Information technology will play an important role in the formation and strengthening of various communities of interests and may contribute to mutual understanding between the people of the world.

Many problems remain to be solved to improve the integration of activities. Among such problems are the reliability of security of information systems, privacy and freedom of information, and the need for developing information resources and enhancing the information distribution system.

(d) A knowledge-intensive value-added product will be created, such as computers, sophisticated telecommunications equipment, and office automation equipment. The new information technology has other implications too: (i) it will contribute to productivity improvement in the industrial sectors through factory automation and robotics; (ii) the digitization of the network will make it possible to link various levels of computers, diverse terminal devices, office equipment, and production machinery; (iii) access to large-scale computers will facilitate the use of softwares and massive files, thus contributing to raising the level of office automation; (iv) the new information network will lead the way to the development of an integrated production complex, thereby unifying management, production, and inventory controls.

In order to implement structural change, the production, development, and reliability of software is required to match the increasing demand. In this respect, the importance of software engineering will be intensified, education and training of programmers and software engineers must be expanded, a programme of continuing education and retraining of office and factory workers must be carried out, and international division of labour in software production will be necessary.

(e) An information-oriented social infrastructure will be enriched. Aided by digital technology, the new information network will be able to carry out in a integrated manner information provision, processing, and transmission, thereby contributing to the enhancement of the quality and conveniences of life.

The development of such social infrastructure requires reliability and security of information, privacy protection, the collection of vast information required to keep the information technology renewed, the development of high quality software, and most important, societal receptivity.

(f) Culture will be preserved and enriched. The new information technology will facilitate the recording and preservation of cultural traditions, language and customs, music, and performing arts through digital integration. It will moreover promote a multifaceted transmission of diverse areas of culture. Computer-aided education will contribute to the promotion of language education, and while preserving unique local languages and dialects, will make it possible to master international languages. Computer translation will serve to lower the language barriers.

However, computer-aided instruction system requires collaboration between software engineers and teachers. Computer translation system requires collaboration between computer scientists and linguists.

Inose's conclusion was that the convergence of service modes, the strengthening of communities of interests, and the enrichment of culture are the three most important opportunities presented by an information-oriented society.

Presentation of Papers

Ko Kheng Hwa, "Effective Information Systems Strategies for the Government Service: The Singapore Experience."

The author of this paper, having had the responsibility, as Director of the Integrated Information Systems Department, National Computer Board (NCB) of managing and implementing Singapore's Civil Service Computerization Programme, reviewed the information systems strategies in the light of five years' experience gained in the programme. The NCB's mission is to drive Singapore into the information age. Its key function is to implement the national information technology plan, and in particular, to exploit and export information technology.

The problems faced in early stages of the programme include: (a) difficulties in starting the computerization projects in ten ministries concurrently; (b) large and complex application systems requiring advanced technology and highly qualified staff; (c) acute shortage of technical manpower and expertise in government and industry; (d) the computerization process was completely new to the potential users; (e) organizational inertia would hinder the changes in work methods, office procedures, and staff roles brought about by computerization; and (f) lack of experience or model from other countries.

The keys to the information systems strategy are total commitment from the government to computerize its operations and strong pressure on government departments to improve productivity and upgrade the level of public service.

The seven key strategies in the implementation of the programme are as follows:

(1) Balance between centralization and decentralization: Computer resources are decentralized to the ministries. The computer information systems department in each ministry plans, implements, and operates the information systems. Professional staff from NCB are deployed in each ministry. (NCB has 450 professional staff.)

(2) Partnership philosophy: The programme advocates shared responsibility for implementation between the NCB (which provides the technology and expertise) and the ministries (which provide knowledge about their objectives and functional requirements).

(3) Management commitment: Each ministry has formed an information systems steering committee and has the responsibility for justifying the need for computerization funds.

(4) Strategic information systems planning: As a first step under the programme each ministry has to conduct a comprehensive strategic information systems planning study before embarking on computerization.

(5) User education: End user education programmes are organized to develop awareness and competency at three staff levels: Top management, middle-level executives, and operational staff.

(6) Framework for data sharing: The NCB established a framework for electronic data sharing among ministries which includes: Identification of data items to be shared, standardization of common data items, definition of a civil service wide data and network architecture, and implementation of data management functions at both intra- and interministry levels.

(7) Moving up the experience curve: A strategy has been devised to train fresh graduates by investing in staff training, engaging overseas consultants and supervisory staff from local software companies on contract, jointly developing complex systems with vendors, and relying on vendor support.

The progress made in achieving the objectives of the computerization programme (fifty mainframe and minicomputers; and twenty-three installations), the number of application systems completed (101 applications systems), attendance at user education programmes (1,000 executives attended), the development of internal capacity within the civil service, and the building up of technological base and infrastructure to exploit and manage information technology, underline the effectiveness of the information systems strategies adopted.

Singapore is now focusing on ten new strategic thrusts, which are directed at: (a) orienting users to apply information technology to achieve their mission; (b) extending information technology application portfolio to exploit new technologies; (c) encouraging experiments and innovations in the use of information technology; (d) integrating and interconnecting systems for sharing of information technology resources and data; (e) developing a receptive and conducive information technology culture among users; (f) fostering greater partnership between ministries to develop interministry systems; (g) establishing an information communication infrastructure to support systems integration; (h) maintaining professional standards; (i) leveraging the computerization to strengthen the expertise base of the information technology industry; and (j) creating a competitive advantage through a civil service made more effective by exploiting information technology.

Singapore is in the process of developing a nationwide network called TRADENET for the exchange of trade documents between government and business.

Christian P. Averous, "Development Strategies for Information Systems Concerning Urban and Regional Planning."

Averous assessed the context for the introduction of information systems into urban and regional planning, the strategies for the development of information systems in Europe, and the implementation issues in the design and use of information systems.

The introduction of information systems into urban and regional planning will be influenced by four trends:

(1) Increasing demands for information. The demand for information is growing in the public sector with the increasing availability of time for the consumption of goods and of leisure-oriented services and also with the development of citizens' right of information and rights of appeal on environmental or consumer protection issues.

(2) Changing telecommunication and computer technologies. A number of experiments and applications in European cities (e.g., Biarritz) and in other local governments, households, and enterprises have benefited from technical progress making economically feasible the treatment of information with microcomputers or with smartcards, the transport of information with the use of satellites to transmit data, texts, and remote sensing and with optical fiber cabling to transport large information flows, and the handling of information and images with the use of simple terminals, personal microcomputers, and terminals using video systems.

(3) Changing urban and regional policy priority issues. Several trends in Europe have significance for the development of information systems (e.g., the rapid urban population increase with consequent priorities given to the management of urban services more dependent on information systems; the changing patterns of population migration resulting in the growth of small- and medium-sized cities and the development of information and commu-

nication policies in older industrial cities; socio-demographic changes lead also to an increase in population groups requiring particular services and amenities).

(4) Economic constraints on employment and public spending influence the choice of strategies for the development of information systems in European cities and regions.

The use of information systems by local authorities in Europe has grown steadily. This experience indicates that attention has to be given to the organization of information systems.

The introduction and development of information systems follows two development strategies. The first and most widespread strategy aims at increasing effectiveness and efficiency in urban and regional planning through the computerization of administrative tasks and through the integration of various applications into municipal information systems to support decision making. A second supplementary strategy, which was recently adopted by a number of cities, aims at contributing to urban and regional development through activities relating directly to information systems (e.g., expansion of information infrastructures by investing in local cable networks, connecting to national and international networks, and joint public/private, local/regional funding; expansion of information services to citizens and enterprises; attracting information related industries through fiscal incentives, creation of information technopoles, provision of information services to small- and medium-sized firms, and strengthening or changing the city's image through advertisement and media-based campaigns). With the development of such activities, there will be competition between cities for new technology; furthermore, there will be a need to coordinate infrastructure provision and the stimulation of both the demand and supply of information services through combined public, private, and nonprofit organization efforts (e.g., the Minitel system).

The use of information systems by local authorities raises a number of implementation issues: (a) cost-benefit analysis of information systems; (b) progressive implementation of information systems; (c) opportunity for more effective organization; (d) technical assistance and maintenance of information systems; (e) training for all levels of personnel; (f) privacy protection; and (g) technical quality of data and information.

The introduction of information systems needs national and local government support. National governments can provide legislative framework, policy guidance, financial resources, and expertise, as well as undertake experiments or projects. Continued exchange of information and experience on information systems or software development among local authorities could reduce wasteful duplication of work and provide some degree of autonomy for these authorities. There is also a need to promote cooperation between local authorities, enterprises, universities and research centres, and nonprofit organizations through an active communication policy. Local authorities can play a major catalytic role in stimulating the development of local communication services, information infrastructures, and new local media through education, information and advice, subsidy and financial support, and investment in infrastructures. They can develop information strategies to encourage cooperation of local research/intellectual institutions and private firms dealing with hardware and software, and to foster concentrations of high technology activities in science parks and technology complexes (e.g., the Karlsruhe technology factory), thereby contributing to socioeconomic and cultural development of the region.

John Lindsay, "Designing and Implementing Information Systems Strategies."

Lindsay provided a summary of what appears to him to be the dominant themes in the literature on the strategies of information systems design. Most of the discussions and arguments in the literature deal with the strategies in the private sector which advocate productivity, profitability, and competition. It is not possible to develop such lines of argument in the public sector. The difficulties inherent in applying such strategies in the public sector are the following: (a) There are no established methods for deciding on the appropriate technique for solving an information problem; (b) it is difficult to establish cost justification or benefit models within the public sector, although it is possible to develop a set of design and analysis tools for drawing tentative conclusions on investments in information technology; (c) there is lack of a higher authority or final arbiter to decide on the correctness of a particular approach or on the most logical form of information systems design; and (d) there is weak linkage and coordination among information generators.

Given the problems with the current strategies and the organizational and technical issues, Lindsay attempted to outline how a strategy might be developed and implemented:

(1) Prepare a general statement of principles, consisting of the following steps: (a) determining the strategic objectives of the organization; (b) establishing the critical success factors; (c) establishing the decision process; (d) establishing the information on which decisions are taken; (e) locating and charting the operations which generate this information; (f) determining the sources of data on which these operations are dependent; and (g) modelling the process by which changes in the data over time affect changes in decisions.

(2) Construct the value chain and the "cost drivers" (Porter's) of the agencies concerned over time. This technique offers the advantage of being able to model the information flows within a public sector service agency. It is possible to identify certain aspects of the information procedure in terms of thirteen factors (i.e., keeping goal or specifying the time for storing data; bulk of data; speed of writing or creating new data; speed of recall of one record sequentially or specifically; frequency of recall; rate of change of data; costs involved; proof of transaction; data transmission; transportability of equipment; compatibility of data; data security; and number and skills of users). If we can model together on a 13 x 5 matrix the capture, storage, retrieval, processing, and communication of information against each of these thirteen factors, then it becomes possible to devise a matrix on the basis of which we can actually calculate the costs involved in each of the possible ranges of decisions to be taken. In other words when we look at the "cost drivers" in terms of the design of the information system, it becomes possible to devise various possible strategies in order to be able to evaluate the investment required in information and in informa-

tion technology.

(3) From the organizational chart and the annual budget, establish an approximate cost per unit, including salaries, building occupation costs, and consumables. Then model some sort of time series into the operation.

(4) Construct the information map of the activities, indicating the movement of information as well as the aggregate and unit costs of the data structure process.

(5) Model the activity cost shifts (e.g., the costs per function in a time series, the cost of information technology, and staff and location costs).

(6) Establish the information systems strategy. This can be modelled for alternative information strategies across the value chain model and related to the corporate strategy. A series of iterations can be made, providing different qualities of change for different designs until the participants agree on the optimum. It is important to design a strategy so that it in turn becomes a process.

(7) Select a hardware, software, design prototypes, and applications.

(8) Decide who will design the strategy.

In the context of the developing countries, we can hardly talk about development. We find that within the world recession the values of currencies and of commodities are changing at such a rate that in no sense can a government say that it has control over its own economy.

Another issue that has caused so much of a disturbance is the very rapid shift in the process of urbanization. This means that most of the arguments for the development of information systems in Western Europe and North America are completely inappropriate because the rate of change of information is so fast that it is no longer possible to really talk about being able to simply transfer one set of information technology to another.

One last difficulty in talking about information systems is that we actually have to explain to people very basically still a set of arguments about information technology because we do not have that kind of experience yet.

Moriaki Tsuchiya, "Strategic Use of Information Systems Among Japanese Private Corporations."

The main thrust of Tsuchiya's presentation is the contention that the new information systems are assuming a strategic importance for many companies in Japan, enabling them to maintain or gain competitive advantage. Developments in information and communications industry are changing the industrial environment and structure. The trends of falling costs of computers and communications services are making more and more uses of information systems both economically and technically feasible in manufacturing companies. In the longer term, more applications will also be feasible for smaller businesses.

The impact of information systems on business is becoming widespread, for instance:

(1) Automated production systems -- Computers made process and mechanical automation in factories possible, which, in turn, paved the way for development of robotics and the flexible manufacturing system (FMS). Computers also contributed to the development of the just-in-time production system of the automobile industry.

(2) Automatic telling machines (ATMs) -- Large city banks began to introduce ATMs in the mid-1970s.

(3) Point-of-sale systems (POS) -- Large wholesalers and retailers began using computers also in the mid-1970s, for POS information to increase profits. For example, Seven Eleven Japan, a large chain of convenience stores, succeeded in utilizing POS information in merchandising and in creating displays by dispatching instructors to the chain stores. Pharma, a voluntary organization of local pharmacies in Osaka, linked members via public telephone lines to a host computer for the exchange of sales promotion ideas.

(4) Use of personal computers to coordinate intracompany functional activities. Since the late 1970s, many manufacturers and distributors have been using small computers for inventory control. Some companies have created a just-in-time distribution system, which has reduced their distribution costs.

(5) Value-added networking (VAN) -- The liberalization of the Public Telecommunications Act in 1982 enabled a group of small businesses to use VAN cooperatively. Furthermore, the privatization of the Nippon Telegraph and Telephone Corporation (NTT) allowed new companies to enter the industry and permitted the establishment of large-scale VAN systems or vertical networking systems. The objective of the vertical networking systems is to reduce lead time or distribution costs. Large companies established their own VAN systems. Matsushita Electric Corporation implemented the Pana-Van Project connecting the IBM and Fujitsu Facom systems on-line by fiber optics cable to establish real-time networking across the country. The project has enabled the corporation to adjust its production schedule and reduce buffer-inventory volume by the just-in-time distribution system. Honda VAN and the Toyota Network System have dramatically reduced the lead time from order entry to delivery. Kao Soap Company organized a distribution networking system to increase its market share for some products. Chain stores and large trucking companies have jointly established VAN systems. Manufacturers, trucking companies, wholesalers, and retailers are competing to obtain the most efficient just-in-time distribution activities.

(6) Voluntary networking systems -- Recently manufacturers and wholesalers started to organize horizontal networking systems on a voluntary basis. In 1986 some local wholesalers and supermarkets

in Shizuoka Prefecture organized VAN systems called Orion, for ordering merchandise. In January 1987 twenty-five small factory automation companies in Greater Tokyo organized FACONET, for receiving orders and exchanging production technology. FACONET is assisting small manufacturers in gaining leverage against the vertical networking of large companies. Establishment of such systems will require acquisition of technical know-how and high quality technology among member companies to make the systems successful.

Tsuchiya identified the lessons learned from the examples of successful and unsuccessful use of information systems in marketing strategies in Japan. First, the success of information systems will depend on users' initiatives. Second, the pioneers in using information systems should continue to reinvest in technology so as to maintain their competitiveness and increase their market share.

Discussions

Johari identified three issues in the foregoing presentations: (a) the relatively limited degree to which specific models or standard strategies developed in or for developed countries are readily transferable to developing countries; (b) with the developments in information technology, attention has to turn to considering the social technology or the organizational aspects of system development and implementation; and (c) the need to provide information and advice to developing countries on computer systems sold by vendors.

Kawakami's comments focused upon the changing role of information systems, from administrative uses and specific planning applications to competitively advantageous uses in government and business. This transformation of role requires strategies to increase awareness (e.g., through the Kawasaki seminars) and stimulate learning and research work which will identify and explain developments and applications and examine implementation experiences.

Al-Tamimi's comments suggested that the task of developing and implementing information systems is proving increasingly difficult and complex. There is a need to exchange knowledge and experiences on this matter. This could reduce the number of needlessly expensive developments and costly mistakes. There is also a need for some educational institutions to provide training programmes on information systems development and implementation.

Two questions arising from the presentation by Hiroshi Inose should be mentioned.

(1) Will information systems promote greater competition among cities or economic areas, or will they promote greater sharing of interests across geographic, economic, and cultural differences? (Marvin L. Manheim)

(2) If information technology is expected to create employment opportunities and offset the decline in manufacturing employment in developed countries, particularly Japan, will information tech-

nology also improve the employment conditions in developing countries where manual labour persists? (Sukehiro Gotoh)

In response to question no. 1, Inose expressed optimism about the possibility of sharing software production, particularly applications software, between the industrialized countries and the newly industrializing countries such as Singapore and other Asian countries. He suggested the organization of an international division of labour in this rapidly emerging area of software production in the hope that this will lead to the formation of a worldwide consortium for the benefit of both the computer industry and the users worldwide, and eventually, distribute new type of industrial activities all over the world.

Inose's response to question no. 2 was that information technology has job-creating potential for developing countries. Developing countries should focus on developing latent capabilities for software development by providing education and training in software engineering. Since the software industry is knowledge-intensive and not capital intensive, developing countries should begin to invest in such industry.

CONSIDERATION OF ISSUES

Thursday, 23 July 1987, 14:30-15:00

Moderator: K. V. Sundaram

Rapporteur: J. S. Edralin

A useful starting point for this brainstorming session, which attempted to synthesize the issues raised in the seminar presentations and discussions, was the checklist compiled and distributed by Sundaram. The checklist of issues reproduced below, illustrates the wide range of factors that can influence the use and application of information systems and information technology. The list is not arranged in the order of relative importance.

- User participation in systems design (Gecolea, Sundaram, and Manheim). Planners are at fault here because they have always been concerned with problems, functions, decisions, input, and output, but they have been less concerned with information and have not really contributed to systems design.

- Information technology (IT), a strategic weapon -- planners should be clear about the basic goals and strategies for achieving those goals (Manheim).

- Goals/concerns, approach, and techniques -- analysis approach for deriving data and information needs as an input to innovative systems design (Sundaram).

- Technological change must be planned and managed. How? (Manheim).

- Information structures must be matched with planning authority structures in a multilevel planning framework. How? (Sundaram).

- Organizational rigidities, a constant. How should these be removed? (Sundaram).

- The human dimension of IT (Manheim).

- Training for machine education and machine training. How should behavioural problems be overcome? (e.g., managerial resistance to change and reliance on time-tested rules, procedures, and methods) (Sundaram, Manheim, Gecolea, Lindsay, Salmona, Batty, Suzuki, Linden, Rose, Suroso, Klosterman, and Yu). There are four aspects of training: (a) awareness training (e.g., UN/DTCD); (b) applications training (e.g., ITC); (c) systems training (e.g., ITC); and (d) interactive training (e.g., the proposed UNESCO training programme). Interactive training has not been discussed yet. Planners and systems designers should come together, mutually interact, and then benefit in the process.

- Developing a climate for creativity and entrepreneurship (Ko).

- Developing a climate for information technology culture (Manheim, Ko, and Sundaram).
- How to reduce the employment displacement effects of technological change (Sazanami).
- How to bring about change without the people becoming victims (Witiuk and Manheim).
- A modular and staged approach for change (Sundaram). How should this be implemented?
- Moving up the experience curve (Ko).
- How to reduce competition and increase complementarity in business (Manheim).
- Competition and competitiveness -- prerequisites for efficiency (Salmona).
- How to strike a balance between centralized and decentralized information systems to obtain the best of both worlds (Ko and Salmona).
- High technology vs. salvageable technologies (Sazanami).
- High cost of information technology and the frustrations faced by administrators, in particular, by using information technology. Even the software has become costly (Sazanami and Lindsay).
- Lack of financial capability in developing countries (Sazanami, Sundaram, Averous, and Gecolea).
- Government-imposed currency and import restrictions or controls (Sazanami).
- Cultural attitudes and values (Sazanami and Sundaram).
- Poor telephone, communication, and transport services (Sazanami, Gecolea, and Averous).
- High power costs and power shortage (Sazanami).
- Labour unrest (Sazanami).
- Red tape (Sazanami).
- Pilferage, materialism, and corruption (Sazanami).
- The absence of auxiliary industries (Sazanami).
- How to secure public-private partnerships in information systems (Salmona and Lindsay).
- Timing issues -- constraints of time in the planning process involving various levels (Manheim and Sundaram).

- Organizational issues (Batty, Manheim, Sundaram, Lindsay, and Salmona).
- Resolving conflicts between a subsystem and the macro system -- problems of networking (Lindsay and Salmona).
- Networking initiatives -- role of international organizations in spelling out information needs for different types, levels, and phases of planning (Sazanami, Sundaram, Rose, and Imai).
- Research issues (Manheim, Nakamura, Kaji, Kitamura, and Edamura).
- Data and information handling -- privacy protection (Averous).
- Technical quality of data and information (Averous and Lindsay).
- Standardization issues -- data, network, and software standards (Lindsay and Salmona).

Discussions

The discussions that ensued suggest that the following issues are important when considering the needs of developing countries for information technology.

(a) Social and political issues

In a recent OECD Urban Affairs Group Meeting on the Impact of High Technology on Cities, the issues discussed were very different from those which have been discussed in this seminar. The issue at the OECD meeting has very much to do with those groups of people in the world who are going to be left out of information technology and access to information technology. There are already major indications that information technology is really the prerogative of an elite in society (and this is equally true in many senses of groups of people in Japan). Indeed the major issue is -- this notion of information-rich and information-poor sector segments of society not only in the home but also in work and whole industries being left out of the information society. This brings social and political issues very much onto the agenda in contrast to economic issues which have been of prime interest in this seminar. There is a whole variety of other ways of looking at information technology, of which the social and political constraints and impacts may be one (Michael Batty).

(b) Organizational issues

Developing countries have a low information base and inadequate hardware and software. Centralization of information systems involves the issue of complexity vs. uniformity of information systems and also the issue of whether it is desirable to have one standard or many standards (Faisal Al-Tamimi).

(c) The use of information technology

Can we see specific ways in which information technology can be a catalyst to employment, economic development, and social change in developing countries? (Marvin L. Manheim).

The problem is how this type of information system can affect the developing countries; on the one hand the issue is whether it can improve the planning process and on the other hand, the issue is whether it has more fundamental impacts on development itself (John Rose).

One issue is whether politicians or decision makers will use the sophisticated data generated by the information systems. Planners should know how to get the most up-to-date information and how to present or communicate this information to politicians or decision makers (Johari bin Mat).

It is difficult to generalize the developing countries' situation with regard to information systems. Developing countries with high GNP per capita are already using such systems to develop their economies, while the least developed countries need to establish the basic information and communication infrastructure (Itoko Suzuki).

(d) Implementation of information systems

The main issues are: How to implement various recommendations on information systems application to urban planning (e.g., those prepared by UNESCO and other institutions); and how to collaborate with national and other international organizations in implementing such recommendations (Hidehiko Sazanami).

The initiative for implementation should be taken by one of the international organizations, or perhaps by UNCRD itself (K. V. Sundaram).

PANEL DISCUSSION: PUBLIC-PRIVATE SECTOR PARTNERSHIPS IN INFORMATION SYSTEMS

Thursday, 23 July 1987, 15:20-17:00

Discussion Leader: Marvin L. Manheim

Rapporteur: James F. Goater

Panelists:
Michael Batty
Hidemitsu Kawakami
Jean V. Salmona
Arporn Chanchareonsook
Johari bin Mat
Moriaki Tsuchiya

Having noted the importance of producing action and research programmes, the discussion leader advised of a potential deviation from the published topic. In making a plea for the active participation of members from the floor he asked what actions were needed by a variety of institutions, UNCRD in particular, with reference to the issues under discussion.

Michael Batty addressed the public-private sector question noting a general trend towards dismantlement of the public-private sector, towards privatization. He noted that generally in his own country at least the private sector was not in sympathy with governments. There was a lack of connexion between public and private sectors and the speaker was generally pessimistic for the future.

Kawakami noted that information recipients are under the influence of the senders, with resulting imbalances. How can small rural companies profit from information? All sectors can function as senders of information, but how?

Salmona said that competition was the key to quality. All private enterprises have to compete, whereas public enterprises don't. Therefore private businesses should concentrate on what they can do best, sometimes better than public enterprises. He advocated cooperation between developed and developing countries in action programmes and research. He outlined one area, viz., medium-sized cities in developing countries where research could be directed towards determining if solutions so far suggested are of relevance. Are such cities the same, in nature?

Arporn wanted to differentiate between systems (regional and urban), saying that cooperation between public and private sectors should be coordinated. Private companies could definitely help in setting up pilot projects, provide assistance to local governments in selecting projects, and provide preproject training to personnel. Urban information systems can be developed through international assistance extended by agencies.

Johari noted that a more action-oriented programme should be developed, particularly in designing, improving, and evaluating information systems. Help was definitely needed to improve indigenous capacity. There was a possible role for UNCRD in extending direct assistance.

Tsuchiya, focusing on public-private sector cooperation, observed that advanced information technology was usually in the hands of the private sector -- thus engendering bottlenecks. There was a general lack of skilled personnel. Governments should exert efforts to develop and strengthen human resources and widen personnel training. Given these resources more innovation is possible. Before talking of advanced information technology, training of personnel is vital. Additionally, fora for exchange of information, such as the ongoing one, were considered of immense value. UNCRD should continue to provide this type of opportunity.

The discussion leader summed up by outlining the major issues to have emerged so far: Firstly, the emphasis on action-oriented activity was noted. This suggested there was a need for accelerated programmes at the working level. Can UNCRD direct this type of approach?

Secondly, there had been a suggestion that agencies could draw on local talent, but international assistance was still necessary. Perhaps an international roster of experts or agencies could be drawn up. Such aspects as project assistance and evaluation, and training could be assisted by this. Could the private sector be encouraged to do this work? The establishment of networks was suggested, e.g., of users, equipment, and training material.

Thirdly, the importance of a forum such as this seminar had been clearly underscored. There was great importance in wide diversity among participants' backgrounds. It was evident that such meetings fulfilled a direct need.

Fourthly, concerning the subject of interregional competition to attract information technology industries, would information technology increase the power of regions that are already strong economic centres? Are there ways for managers to counter the possible imbalances? This suggested a possible research need, i.e., what strategies should be pursued to overcome potential inequalities? Expert group meetings and seminars would be one way to tackle the problem.

The discussion leader then solicited additional points and policy research questions. The response to this was that Tsuchiya asked Kawakami the potential power of information systems -- what are the benefits? What ongoing improvements in living standards are taking place? There are many obvious areas of unexplored possibilities. The response indicated that the sheer diversity of functions of information systems held enormous potential for the future. From the floor, Ohshima opined that in the area of public-private cooperation there were few areas for debate. Information was an asset which must be shared. He noted the enormous difficulties involved, giving the example of software developed in Japan being re-exported to Japan! Additionally the great cost of information systems development requires some form of cooperation between the public and private sectors. He is impressed by the ongoing seminar but feels that objectives and the formulation of concrete measures to achieve the objectives are necessary.

Linden, from the floor, noted there was a role for international organizations in promoting available knowledge and expertise on what systems are available to the users. This would be an invaluable service. Batty responded by agreeing with the desirability of such knowledge but doubted its feasibility, noting the great difficulty in knowing what sort of system is best in a given situation with specific requirements. Consultants from the private sector should have a role to play here. Salmona, on the same topic noted some successful adoptions of relevant information systems in response to requests (specifically a cadastral survey system developed in Sweden which was successfully utilized in Senegal). The Data for Development International Association (DFD) provided the knowledge enabling the correct choice of system to be made. Could UNCRD provide a similar role?

Arporn wanted to reiterate her original point that private companies can help with technical issues; also private enterprises from other countries can be of assistance. Thus there is a need for international aid in the form of technical assistance from companies in the developed countries. UNCRD could hold meetings of top international experts. This could be of great value in policymaking in the developing countries. The discussion leader noted this possibility -- the sharing of managerial expertise.

At this point UNCRD Director Sazanami wished to enlarge upon the unique position of UNCRD in providing assistance. Its collaboration with other UN agencies in a wide range of fields enabled it to encompass such a wide range of activities. Being a small organization such work would be impossible without this wide range of collaboration. In this way UNCRD can mobilize considerable resources -- governments, local governments, and universities. The main question is how to arrange such collaboration.

The discussion leader observed at this point that a possible way would be for these bodies to organize scientific advisory committees made up of nongovernmental organizations such as SORSA or DFD -- other similar organizations could be involved. He suggested a catalytic role for UNCRD.

Upon request from the discussion leader, Arai from the floor noted that from his own observations there were many differences in types of information being used by public and private sectors and, hence, difficulties in joint usage, e.g., how could small business use information such as land surveys? He also noted that the public sector is not concerned with the needs of the private sector. The public sector is never forthcoming on advice as to what is necessary. Useless information is often generated. There are problems at both the working and conceptual levels.

The discussion leader noted that data marketing was advocated by the first Kawasaki Seminar. Also noted was the fact that there was a difference between private and public data requirements. This suggested action along the following lines: That private consultants were needed at the public sector data requirement planning stage to ensure that the data generated was of wider applicability. It thus followed that public data should be more widely usable and marketable.

Witiuk made a three-point contribution. Firstly, that more privatization was needed, with a wider scope needed for the public sector, which would lead to the production of more marketable data. Secondly, he suggested the formulation of a roster of specialists but observed that previous experience (SORSA's) indicated that a lot of redundancy could be produced. The discussion leader interjected here with his own suggestions as to what form an international roster could take. Following publication of a directory, an international network could be established, computer linked containing all this relevant information. Witiuk continued with his third point (a question) -- Could people be involved in ongoing conferencing to keep people in touch with the latest developments as well as in the production of guidelines to lead people through the acquisition of systems relevant to planners in the developing countries?

Batty, in response, reversed these terms, i.e., a public use of private data. This involved new roles, e.g., information brokers or sellers. With purchases of high quality data to be used in the public sector, could UNCRD have a role to play? He opined that data should be a free resource, and foresees future problems in the area of commercialization of data.

The discussion leader then requested more action or research needs from the floor. His suggestion that the floor should consider value-added networks (VANs) was taken up by panelist Tsuchiya who noted the growing relevance of VAN after its two-year usage. He solicited a comment from Arai. In his opinion and experience VAN was used principally in the area of journalism. VAN was an example of decentralization, though he had few new suggestions as to a wider application for its use. He noted that there were ongoing efforts to realize dreams. Japan was now lagging in data base formulation, and access opportunities. Finally, he described a nationwide highspeed NTT network to exchange reference material, to be utilized by universities. Additional comments on VAN were elicited from Ko, by the discussion leader. In enlarging upon this request, Ko stated that from the Singapore viewpoint VAN's role was principally in the area of foreign trade. Attempts had been made to learn from the developed countries' ways of limiting the huge flows of paper. VAN was regarded as a kind of data highway to facilitate a smoother flow of information. He agreed with Salmona's view that the private sector should do what it is best at and noted that some private information is simply not usable by public enterprises. Users should be consulted so that total systems design could take place. It is important to consult the private sector as the public sector may not necessarily be in the best position to judge. Additional comments were called for from Averous who had earlier presented a paper on "Development Strategies Concerning Information Systems in Urban and Regional Planning" detailing Minitel experience. He stated that this experience showed that nonprofit organizations have a role to play as they are outside both public and private sectors. Perhaps there is a UNCRD role here, he observed. There were benefactors and losers in the process of information system usage, so that a prime question was how to maximize benefits while minimizing "casualties." International access to information was also a relevant issue, as was the potential misuse of information.

At this juncture the discussion leader requested the panelists' closing comments. Salmona had a word on methodologies wondering whether there could really be any possible transferable methodologies. He sketched out a forthcoming seminar at which a French system was to be inaugurated in China. Some issues cannot be discussed before experience has been gained. This raised the fundamental question of appropriate technology.

Batty concluded with an observation that as soon as user-charges are imposed for hitherto freely accessed information services, perhaps the demand would decrease.

The discussion leader closed the session by underlining the point that access charges may inhibit the growth trends in information systems usage.

SESSION 5: APPROACHES TO AN ADVANCED INFORMATION CITY

Friday, 24 July 1987, 9:30-12:30

Moderator: Yoshinobu Kumata

Rapporteur: Sachihiko Harashina

Speakers:

Hideki Shimizu, "Campus City Kawasaki: Outline of International Concept Design Competition."

Peter Droege, "Technology for People: A Campus City Guide."

Takeshi Kosuge, "Programmes for an Advanced Information City."

Presentation of Papers (Summary by J. S. Edralin)

Hideki Shimizu, "Campus City Kawasaki: Outline of International Concept Design Competition."

Shimizu briefly explored the changing role of Kawasaki from an industrial city to an advanced information city, and then discussed the Campus City Kawasaki concept, which included an emphasis on the development of an urban environment conducive to citizen involvement and participation, and on the development of a city with identity.

In setting up the project, the intention was to develop Kawasaki as a campus city, and to define the city identity by describing the entire city area using the model of a university.

The four concept themes of the competition are listed below:

(1) Intelligent Plazas. The Intelligent Plaza concept envisages the use of existing or newly created buildings and spaces, to serve as urban facilities and as decentralized units of the university. The Intelligent Plazas are intended to meet the communication needs of citizens.

(2) Kawasaki Institute of Technology (KIT). The creation of an open, innovative university is the major strategy for realizing the image of Kawasaki as a campus city. KIT will be established through the cooperation of the existing research and educational institutions in Kawasaki, Japan, and abroad.

(3) Campus City Festival. The Campus City Festival is designed as a continuous series of events held within and throughout the entire city, utilizing advanced information systems and involving the citizens as participants in, as well as observers of, the Festival.

(4) Intelligent Network. The Campus Area Network will provide information and communication services for the city. It will

allow more effective interaction between and among private enterprises, government agencies, and citizens in the city, and with others in Japan and throughout the world.

Shimizu concluded that the overall need is to ensure the continued implementation of the Campus City concept. He laid emphasis on the importance of receiving wide approval of the new Kawasaki image -- expressed in the term "heartware."

Peter Droege, "Technology for People: A Campus City Guide."

Droege said that he was making his presentation with great gratitude to the organizers of the 1986-87 International Concept Design Competition for an Advanced Information City. (He received the grand prize of the competition.) He thought the outcome of the competition, even though it yielded some prizes, was very much the product of that competition process. He said he had been attracted to the competition because it was conceptually broad-based, ambitious, and designed to cover economic, cultural, social, and other issues before looking at information technology. He talked a little more about the implications of the concept -- that information technology by itself does not determine society's direction, or at least should not be permitted to do so. Rather it is the community's value system which should generate ideas and guidance and then in turn set policy for the application of technology.

Before presenting his proposal, Droege attempted to look at the historical role of the environment as an information management medium and as a constructor of social reality. Traditionally, cities and buildings functioned as controllers and distributors of information. He cited several examples of such cities and architecture.

Droege said he was presenting his team's proposal exactly as he presented it to the jury on 24 May 1987. The title of their proposal is "Technology for People: A Campus City Guide." The prime purpose of the Guide is to show how technological innovation can be used to build communal identity, cultural continuity, and a connexion to the city's roots.

Three different, but inseparable components of the transparent, open city concept were stressed by Droege:

(1) The Kawasaki Institute of Technology (KIT). The idea of a broad citywide education is at the base of the Campus City concept. When all the people can say that the city is our school, then we will have a campus city. It will be a city built by the people, for the people. It will place technology in the hands of the people. An Intelligent City Map will be the first KIT catalogue. A first KIT neighbourhood network involving people, companies, and educational institutions will be tested and expanded into a citywide network, with national and international links. Through KIT peace studies programmes, we can learn about the root causes of human conflict and teach children about how to build peace.

(2) Intelligent Places. Kawasaki's identity will come from its intelligent communities, its transparency, and the accessibility of its learning resources. Intelligent places will grow inside

the neighbourhoods, in the buildings, around small parks and gardens, with intelligent facilities for information exchange. Workshops, data shops, soba (noodle) shops, sake (alcoholic beverage) shops, and children's centres will be owned and managed by the neighbourhoods, coordinated by the ward centres of City Hall, and supported by a public information utility. The downtown and the industrial areas will see new spaces and redevelopment of existing buildings, and smart boxes and information fountains will emerge in the city. This change can be helped by city planning. The transportation system (Nanbu railroad line) will be turned into a high energy information corridor. A metro plaza will integrate the train stations via an intelligent moving platform. A river project (Tama river), with supporting light monorails, community and agricultural research gardens, parks, and recreation areas, can become a natural antenna for communicating with similar places and rivers of the world.

(3) The City of Festivals. Kawasaki as the "City of Festivals" can strengthen traditions by participation, by giving support for action, and by providing memory for guidance. Festivals are learning and communication environment. They strengthen Kawasaki's neighbourhoods and links to the rest of Japan and the world. The entire city, through the Campus Area Network and the intelligent places, can be the staging ground for festivals. The Kawasaki World Information Exposition can display the city itself as a community sculpture of infinite complexity and information. The Language Festival will celebrate all forms of expression and communication. The Sky Festival will celebrate the sky, the air, and the heavens as a high technology medium.

Droege finished by reiterating that information technology alone cannot make the change happen. And the process cannot be centrally directed from the top -- it has to grow up from the bottom. KIT and the Campus City need the active participation of the citizens. By looking for ways to place technology in the hands of the citizens, Campus City Kawasaki may just be already in progress of becoming an international model of how to rebuild cities of the future.

Takeshi Kosuge, "Programmes for an Advanced Information City."

Kosuge outlined the regional information services projects being undertaken by Kawasaki City in cooperation with a number of Japanese ministries. These projects are part of the city redevelopment and rezoning plans, and are being implemented in accordance with the national guidelines on enhancing regional information services.

Some of the projects include:

(1) the designation of Shin-Yurigaoka city centre as a model city project under the TELETOPIA Plan of the Ministry of Posts and Telecommunications.

(2) the designation of the original city centre as a model zone under the Future Information Metropolis Plan of the Ministry of International Trade and Industry.

(3) the designation of five major development zones as model urban zones under the Intelligent City Plan of the Ministry of Construction; these include the TECHNOPIA region, the original city centre, the new city centre, the Kanagawa Science Park, and the Microcomputer City Plan region.

(4) the development of a new centre for information infrastructure development to be undertaken by both the public and private sectors.

Kosuge raised questions about the appropriate organizational structure for information infrastructure development; finding out what information systems users need and providing what they need; the costs of constructing information infrastructure and of introducing new information systems; and the integration of information systems policies with the city, regional, and social development policies. He pointed out that the expansion of regional information services cannot be achieved without resolving such issues.

Panel Discussion (Summary by J. S. Edralin)

Discussion Leader: Yoshinobu Kumata

Panelists:	Marvin L. Manheim Hideki Shimizu Kazuhiko Gotoh Peter Droege Takao Hirosawa Hideki Komatsu

The Advanced Information City Concept

The first round of discussions centred on the advanced information city concept. The panelists were Takao Hirosawa, Kazuhiko Gotoh, Marvin L. Manheim, and Hideki Komatsu.

Hirosawa summed up the essence of the Ministry of International Trade and Industry's (MITI) approach to fulfilling the advanced information city concept in Kawasaki: The city would be transformed from an industrial city into an information city, but MITI would do so by incorporating the industrial complex and the technical and human resources that were originally needed to create an industrial city in the new concept. Expanded information and transportation networks that support the information city will be created.

The advanced information city concept is now being positively promoted by several ministries. The challenge is to find ways to coordinate the various proposals. Kawasaki City has measured up to the challenge by serving as a coordinator of the proposals.

Gotoh, a member of the Kawasaki Cultural Affairs Council, shared the view that the campus city concept has to be coordinated with the TELETOPIA, the New Media, and other concepts. But he added three provisos to that strategy:

(a) The relationship between the concepts has to be clearly defined;

(b) The transportation system has to be redeveloped or reorganized in terms of the whole city. A redeveloped transportation system will facilitate access to places and information;

(c) Efforts should be made to bridge the gap between citizens and information facilities by using mediators or catalysts. Such an institution or expertise would ensure citizen cooperation and the effective use and functioning of the facilities.

In his supportive comments (i.e., "comments of excitement"), Manheim applauded the City of Kawasaki and its sponsors for defining a competition in terms of behaviour, values, lifestyle, and education. He applauded also the winning proposal (Peter Droege and his team) for responding to the campus city concept in a very imaginative way. That concept, according to Manheim, is what planning in the era of information systems should be about. He said, "That is an exciting vision that is put before us by the bold terms of reference and by the very bold and imaginative response." Nevertheless, the implementation of the concept raises a number of difficult questions: How can we influence human behaviour in a positive way through the use of information systems? How can information systems stimulate casual contact and structured contact? How can information systems stimulate exploration of new ideas and knowledge? How can information systems stimulate creativity, growth, and response to the increasing challenge? How can information systems not increase the isolation of modern man, but decrease the isolation to help people to be part of a broader community? It is Manheim's view that it is difficult to implement the campus city concept to achieve desirable interactions between individual perception and cognition, and the information systems which will be established.

Manheim recommended that the Kawasaki campus city concept be strongly tied to an active and ongoing research programme. In this sense, planning-implementation is action research, with very strong emphasis on active citizen role, pilots, initial experiments, and prototypes. In addition, there needs to be a very strong analysis of the hardware and software features, including networks and access points that will support the incremental evolution (i.e., the dynamic, organic concept) of the plan.

Manheim spoke of the city as an interface and as a marketplace of services. Mechanisms are needed to stimulate those services. He concluded that the concept is a very exciting proposal and should be the focus of a worldwide experimental programme.

Komatsu described in brief Kawasaki City's approach towards implementing the campus city concept. While Kawasaki has been making an important shift from an industrial city to an information city, it has also been making an effort to utilize the stock of industrial technology and technological capability in the development of the new information city. Major projects include the creation of a worldwide industrial data base which will be ready for use in May 1988, the establishment of the MICOM city scheme which will provide R & D information to small- and medium-sized enterprises beginning autumn 1987, the open museum, and the construction of intelligent buildings for lectures, courses, and open educational forums. The national government, the Kanagawa Prefecture, and the private sector will be active partners in these projects.

According to Komatsu, the proposals embodied in the campus city concept will be reviewed by a promotion committee composed of city department and section heads. An action plan will be laid out to implement the proposals. Prior to this, weekly citizen forums will be held for three months (August-October 1987) to disseminate information and obtain citizen responses to the proposals.

Citizen Participation

The second round of discussions focused on citizen participation in the campus city scheme. The panelists were Hideki Shimizu and Peter Droege.

Shimizu spoke of an immediate need to present the scheme to the citizens of Kawasaki and to get their agreement and participation. By holding citizens salons and symposia, the city can obtain the views of citizens and owners of small- and medium-sized enterprises and incorporate their views in the final plan. Through time and effort a pyramid of citizens support can be built step-by-step. As the physical structure of Kawasaki City is based on the "open-system" concept, the campus city scheme enhances the concept and emphasizes flexibility in integrating a variety of models.

Droege drew attention to a "triple P" challenge to the city -- the challenge of programme, the challenge of people, and the challenge of place. The challenge is indeed to set up an urban laboratory for master programming. Past focus on master planning or grand design planning was not the effective route to participation. Civic or public programming, or participatory programming of civic direction tries to identify the citizens' self-interests, against which a strategy is laid to activate the citizens.

The placemaking aspect, i.e., creating an environment for eliciting response or a laboratory for testing ideas, also must be taken into account. This seems to be the most tangible way of learning about how the citizens will use the city -- the city as a construct of networks for their own purpose and for their individual families', neighbourhoods', and the intelligent community's purpose.

CLOSING SESSION

Friday, 24 July 1987, 14:00-15:30

Moderator: Marvin L. Manheim

Chairman of the Drafting Committee: Michael Batty

Rapporteur: James F. Goater

The session's principal objective, as outlined by the moderator, was to review and solicit approval for the draft declaration and plan of action which had been drawn up in response to the previous three days of proceedings.

Michael Batty was called upon to read out, to the meeting, the contents of the draft Kawasaki Declaration, after which comments and/or revisions and amendments were solicited from the assembled participants. The main areas of discussion centred around the following:

(1) The opening paragraph of the declaration was focused upon by Tamimi who took exception to the words "problems" and "deteriorating" preferring instead "issues" and "changing." His reasoning was that the existing words conveyed a negative connotation exclusively so that a softening was clearly desirable. This change was agreed to by the drafting committee chairman.

(2) Sundaram remarked upon, firstly the relative neglect of the rural areas in the declaration, noting that international organizations such as the FAO were attaching increasing significance to the development of rural information systems. Secondly, he remarked upon the fact that in the area of training, innovations could only result from interactive training -- a specific training area he felt should be reflected in the declaration. In response, the moderator suggested a substitution of the word "urban" with the word "local" and an additional reference to "urban and rural areas" in the same paragraph. Regarding the second concern -- interactive training, further views were forthcoming from Sundaram, before the moderator requested Averous to draft a suitable wording to be added to subparagraph (b), of page 3 of the declaration. It was agreed to add "... to ensure interactive and adaptive training capacities" to the aforementioned subparagraph.

(3) C. Imamura of Kawasaki City, referring to subparagraph (2) of page 2, felt that the word "required" was an unnecessary limitation on "human resources" to be developed through education and training activities. In agreeing that to place a limitation on these resources without specifying what these limitations were was perhaps undesirable, both Batty and Manheim agreed to a deletion. However, Ko of the drafting committee gave "the other side of the story" and noted that point 2 of the same section was intended to narrow the focus, carrying on directly from point 1. This was to emphasize that the human resources under question

were those needed to develop and use information technology creatively. By deletion of "required" the focus would be lost and a more general effect would remain. The moderator noted the difference in approach with reference to the morning session and suggested that Ko could perhaps draft additional wording to satisfy both viewpoints.

(4) Droege expressed a wish to incorporate at a relevant juncture, a clause which would embody a call for the promotion of increased self-reliance in the production and use of information technology in the developing countries. He warned against the rise of a possible "information imperialism." He also sounded a strong warning against viewing information technology as anything more than a tool to aid planning. In his view information technology could never substitute for the kind of hard "human" decisions which have to be made during the process of planning. Information technology was neither planning substance nor any kind of panacea for development problems. He therefore sought a reflection of this view in the declaration. The suggestion was put under advisement while other points were considered.

(5) Linden considered two areas of importance to be missing from the document: The promotion of standardization -- to simplify the work of planners, and a call for more cost/benefit analysis of information strategies. The latter aims to facilitate more effective assessments to be made of this type of approach over other forms of investment. The moderator accepted the importance of this issue but noted that it was included in the lengthier Plan of Action document. However, following more exchange of views it was decided to embrace both viewpoints with suitable wording to be incorporated in subparagraph (e) of paragraph (3).

Regarding cost/benefit analysis, the moderator cautioned that some circles would argue that organizational advantages inherent in the adoption of information technology were not readily apparent from cost/benefit analysis, to which Linden responded that given limited resources there should be some means of evaluation to assist in the selection of the best investment choices. It was therefore decided by the moderator to add "methods for assessing the benefits and costs of information systems strategies" to subparagraph (e), page 4. This was approved.

(6) Returning to issues concerning human resource development, earlier discussed, Ko suggested additional wording to be added to subparagraph (2) of page 2, "including those required to develop and use information technology widely and creatively." (This later became subparagraph (3).) This revised wording was approved.

(7) Again, referring to earlier issues, Droege's concerns of "fossilization" of planning methodology, and, restricting "information imperialism," the moderator suggested tentatively a wording that encompassed Droege's ideas of revitalizing planning through increased use of information systems and technology. Batty preferred the word "renew" to "revitalize."

Further discussion ensued concerning the fear that increased information systems usage could put to further disadvantage already backward regions. Droege persisted with the point, pressing the moderator, who finally suggested a new subparagraph (1), page 2, to be inserted before the call for continued development and application of information systems. This new section was to read, "the participants call for conscious attention to using information systems and technology to promote development in all sectors and regions to reduce disparities and inequalities."

(8) Phillips had drafted a "vision" statement which urged that information systems be used to "promote personalized technology for the improvement of society at all levels and places." At that stage, however, it was undecided where such a statement should be included. His suggestion that the entire document be restructured to better facilitate any future evaluation of progress towards the objectives was noted, but Batty felt that at that stage of the proceedings any reworking of the existing structure would mean that there could be no final approval of the declaration due to purely organizational reasons. He also outlined an existing rudimentary structure to the declaration although he allowed that this was not readily apparent. He mentioned areas of the more lengthy document, the Plan of Action, which possibly took into account the issues which Phillips was concerned about.

The moderator, remarking that UNCRD could review the restructuring suggestions accepted the need for a "vision" statement and, using Phillips' wording suggested its inclusion as a new subparagraph (1), to begin page 2.

(9) A final contribution was forthcoming from Tamimi who had reworked the issue of human aspects of planning. He suggested a new subparagraph to take the place of earlier wording on the same issue. The new statement was thus to read, "...to ensure the use of information systems and technology as an aid to improve upon the human quality of planning and decision making toward the promotion of a better quality of life."

The moderator noted this contribution and attempted to incorporate it into the existing statement. A final decision on the exact wording, however, was deferred to the secretariat. There was no further discussion.

The modified declaration was then put to the meeting for a vote. Upon its acceptance, the chairman of the drafting committee was called upon to present a quick outline of the contents of the Plan of Action. In summarizing the essential points, Batty endeavoured to give an accurate rendition of their contents. There being no time for discussion, Kawasaki Mayor Ito and UNCRD Director Sazanami, in turn, then delivered their closing addresses, which brought the Second Kawasaki Seminar to a fitting conclusion.

APPENDICES

APPENDIX 1. LIST OF PAPERS

Keynote Speeches

Salmona, Jean V.
Public/Private Partnerships in Information Systems in Public Administration

Sazanami, Hidehiko
Information Technology and Regional Development: Challenges and Opportunities for Developing Countries

Papers

Adam, Ralph and Rose, John B.
Problems of Implementation of and Training in Information Systems for Subnational Development Planning

Arporn Chanchareonsook
Information System Project for Urban Planning at the Bangkok Metropolitan Administration

Averous, Christian P.
Development Strategies concerning Information Systems in Urban and Regional Planning

Batty, Michael
Educating Planners in Information Technology: Experiences from Developed and Developing Countries

Clercq, Frank le
Evaluating the State of Information Systems in Amsterdam

Droege, Peter
Technology for People: A Campus City Guide

Edamura, Toshiro and Fukushima, Tohru
Integrated Urban Planning Support System (in Japanese; with English summary)

Gecolea, Romeo H.
Information Systems for Rural Development

Gotoh, Sukehiro
A Global Environmental Information Network: INFOTERRA

Hirosawa, Takao
Urban Planning in an Information Society (in Japanese)

Hori, Hajimu
National Land Information and its Application for Regional Planning (in Japanese; with English summary)

Inose, Hiroshi (guest speaker)
Challenges for an Information-Oriented Society: A Japanese View

Inoue, Yojiro
Using Information/Communication Systems for Regional Promotion (in Japanese)

Kaji, Hideki
Information Processing System for Disaster Management

Kawakami, Hidemitsu
The Theory of Urban Environmental Master Plan for Kawasaki City and the Development Guiding Principle for the Plan's Supporting Information System

Kitamura, Teitaro
Methodological Considerations on Information Processing Systems for Regional Planning

Klosterman, Richard E.
Microcomputer Technology and Regional Planning: Prospects and Challenges for the Developing World

Ko Kheng Hwa
Effective Information Systems Strategies for the Government Service: The Singapore Experience

Kosuge, Takeshi
Programmes for an Advanced Information City

Kumata, Yoshinobu
Interactive Design Process for Campus City Kawasaki: An Approach to Cooperative Change towards an Advanced Information City

Linden, Gerard
The Development of Curricula in the Field of Geo Information Systems: The ITC Experience

Lindsay, John
Designing and Implementing Information Systems Strategies

Manheim, Marvin L.
Using Information Systems to Compete Successfully in Today's World: A Challenge to Managers

Matsuzaki, Takayasu
An Approach to a Renovated Educational and Training Programme for an Information Society (in Japanese; with English summary)

Montanari, Armando
Environmental Analysis for the Economic Development of the Mediterranean Region

Morooka, Koji
Future of Regional Medical Information Systems (in Japanese)

Nakamura, Hideo, Shimizu, Eihan, and Shimoyama, Yasushi
Remote Sensing and Cadastral Data for Geographic Information System (in Japanese; with English summary)

Oyugi, J. H. and Suzuki, Itoko
Training for Information Resources Management in Public Administration

Salmona, Jean V.
Strategies for Developing and Implementing Information Systems in Public Administration: From Classical Informatics to New Information Technologies

Shimizu, Hideki
Campus City Kawasaki: Outline of International Concept Design Competition

Sugimoto, Hiroshi
Integrated Administrative Information System: Project Planning Support System (in Japanese; with English summary)

Sundaram, K. V.
Changing Data and Information Needs for Agricultural Planning: The Challenge for the Developing Countries

Suroso Moersidi
The Remote Sensing System and Digital Processing for Regional Planning and Urban Monitoring in Indonesia

Takemura, Akira
Support System for Urban Planning in Hyogo Prefecture (in Japanese; with English summary)

Tsuchiya, Moriaki
Strategic Use of Information Systems among Japanese Private Corporations

Tsuji, Shinroku
Development of Small- and Medium-Sized Business Organizations by Strategic Use of Information Technology (in Japanese)

Witiuk, Sidney W.
Promoting Spatially-Oriented Referencing Systems Development at the International Level

Yokouchi, Syoumei
City in an Advanced Information Society (in Japanese; with English summary)

Yu Hong
Information Systems Project for Urban and Regional Planning in China; and

The Training of Chinese Intermediaries and Users of DIALOG, ORBIT, ESA-QUEST Online Information Retrieval Services

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APPENDIX 4. AIDE-MEMOIRE OF THE SECOND KAWASAKI INTERNATIONAL SEMINAR ON THE INFORMATION SYSTEMS CHALLENGE FOR GOVERNMENT AND BUSINESS

Seminar theme: Challenges Facing Managers and Officials in Business and in Urban and Regional Planning in Developing and Developed Countries

The Seminar in Brief

The Second Kawasaki International Seminar on the Information Systems Challenge for Government and Business will focus on the challenges facing managers and officials in business and in urban and regional planning in developing and implementing their information systems. It will bring together participants from various parts of Asia, Europe, Middle East, North America, and Oceania, to speak about the experience of successful or unsuccessful information systems.

The first basic premise of the seminar is that the effective introduction of major information systems into organizations requires carefully-designed training programmes to develop the organizations' capacity to use new information technologies effectively. This theme is common to all sectors (public and private sectors, and developing and developed countries), even though there are also important differences.

The second premise of the seminar is that it is useful to bring all these sectors together to learn from one another and identify useful common approaches as well as important differences.

Most of the papers to be presented at the seminar will be invited. However, other experts may also propose to contribute papers on any of the suggested seminar topics.

The Need

The seminar has a triple purpose:

(a) To consider the developments in information systems and technology which have taken place within organizations over the last five years;

(b) To identify the lessons learned that will be of relevance to other organizations in the position of developing their information systems, evaluating their existing systems, assessing their future requirements, and proposing the development of an information systems strategy;

(c) To provide guidance to organizations, particularly the United Nations Centre for Regional Development (UNCRD) and the Kawasaki City Government in developing their information systems programmes.

Objectives

The seminar aims to enable participants:

(1) to make contact and exchange ideas and experiences with managers and officials responsible for designing and implementing information systems, and directors of training and research programmes in computer-assisted business or urban and regional planning from various organizations; and to meet and discuss their current problems with leading international experts in developing and implementing their information systems.

(2) to review and assess current experiences and trends in the use of information systems in business or in urban and regional planning.

(3) to prepare suggestions for further research and training activities, and guidelines for the introduction or expansion of information systems use in business or in urban and regional planning.

The seminar will present and discuss the findings of Phase III of the UNCRD Research Project on Information Systems for Local and Regional Development. Phase III is concerned with the Evaluation of Information Systems Projects and Training Programmes in Information Technology for Regional Planning.

Participants

The seminar is for managers and officials with responsibility for designing and implementing information systems, or directing research and training programmes associated with those systems in business or in urban and regional planning. It is expected that international experts from relevant international organizations, universities, and information systems associations will also take part.

Organizers

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Kawasaki City Government
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Programme

Paper presentations and discussions on the following topics:

The Challenge of Information Systems Today

Information Systems Opportunities

Comparative International Case Studies and Evaluations of Information Systems Projects and Training and Research Programmes in Information Systems for Planning

Developing and Implementing Effective Information Systems Strategies

Approaches to an Advanced Information City

Panel discussions: Public-Private Sector Partnerships in Information Systems; and Approaches to an Advanced Information City

Topic 1: The Challenge of Information Systems Today

Business and planning organizations, and particularly their information systems, will face important challenges as they move into informatization. Their ability to respond to these challenges in the future may very well depend upon their capacity to satisfactorily cope with the pace of technological change. With the rate at which information technology is being introduced in these organizations, well-thought-out information management strategies are needed. The purpose of this topic is to underline the key role that information systems may play as these organizations face the problems of moving into informatizaticn.

Topic 2: Information Systems Opportunities

Information systems serve various needs in business and planning organizations, such as improving efficiency and increasing effectiveness in planning, implementation, and service delivery, increasing control capabilities of management, and providing strategic information for decision making and planning.

An effective information system requires: (a) determining relevant information needs; (b) providing accurate or reliable responses to information needs; and (c) delivering timely information to users.

Computer-based information systems can provide a better base for data handling and data processing. Computer-aided models and other software tools are employed in supporting decision making and planning. A better understanding of the potential applications of decision support systems, artificial intelligence/expert systems, and other software approaches can provide a useful help in preparing, implementing, and evaluating plans and projects.

There appear to be six trends associated with the use of information technology which will have an important bearing on the way business and planning organizations, particularly their information systems, operate: Trend One -- Computer software tools for business or for regional planning; Trend Two -- On-line access to data bases; Trend Three -- Computer networking; Trend Four -- Teleconferencing; Trend Five -- Telecommuting; and Trend Six -- User control of computing power.

Topic 3: Comparative International Case Studies and Evaluations of Information Systems Projects and Training and Research Programmes

The seminar programme is built around a series of country case studies of existing information systems for business or for urban and regional planning and evaluation reports of training and research programmes in computer-assisted regional planning. An appreciation of work done by business or urban and regional planning organizations, training institutions, international organizations, and information systems associations is particularly important to an understanding of the developments in the field. Presentation of country case studies and evaluation reports will provide an international overview of the strategic issues and problems in developing and implementing information systems projects and training and research programmes.

Each case study and evaluation report will give a frank assessment of: (a) how well and how effectively the project or programme is performed; (b) the factors that seem to contribute to or inhibit the achievement of the project's or programme's objectives; and (c) how the project or programme could have been improved.

Topic 4: Developing and Implementing Effective Information Systems Strategies

Most information systems so far have been developed piecemeal as the need arose and changed. Frequently there have been serious problems which have impeded successful implementation. Some of the constraints on information systems are efficiency, timeliness, accuracy, security, compatibility, implementability, maintainability, flexibility, robustness, portability, acceptability, and cost-effectiveness. Factors which can be identified as assisting the introduction of information systems into the business or urban and regional planning processes are continued top-level support, a clear and consistent strategy, management awareness, training of staff at all levels, integrated responsibility, and user involvement. The seminar will explore and discuss these issues.

Panel Discussions: (1) Public-Private Sector Partnerships in Information Systems; (2) Approaches to an Advanced Information City

Two panel discussions will highlight the issues raised in the presentations and discussions. Well-known experts from developing and developed countries will be asked to respond from their personal and very different perspectives to questions relating to: (a) strategies and practices in participative or collaborative information systems development and implementation; and (b) approaches for improving the prospects for implementing the information city concept.

ABOUT THE UNCRD

The United Nations Centre for Regional Development was set up in 1971 in pursuance of the terms of ECOSOC resolutions 1086C (XXXIX) and 1141 (XLI) which called for global action to promote regional development, and resolution 1582 (L) that provided guidelines for its establishment. The principal aim of UNCRD is to enhance the capabilities of the developing countries in local and regional (subnational) development and planning. Towards this aim, UNCRD organizes training courses, promotes collaborative research on substantive issues in regional development, extends technical advisory services, serves as a forum for exchange of experiences, and fosters exchange of publication and information on local and regional development and planning.

The activities of UNCRD are organized under three interrelated programmes. Each programme has an advisory services component. Programme I, Human Resource Development, encompasses training. Training activities consist of an international training course in regional development planning and an international training seminar in local social development planning held each year in Nagoya, and a number of short-term regional and country-specific courses. The courses are designed to provide the participants with ample opportunities for the sharing of knowledge, skills, and experience concerning local and regional development. Programme II, Knowledge Development, encompasses research. Research activities are carried out mainly through a network of institutions in developing countries, being initiated, coordinated, and often funded by UNCRD. Programme III, Knowledge Dissemination, encompasses information exchange and documentation. UNCRD's role as a centre for exchange of new ideas and experiences is fulfilled by its numerous periodic and ad hoc publications as well as by frequent workshops and seminars, bringing together scholars, government officials, and practicing planners from various countries.

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